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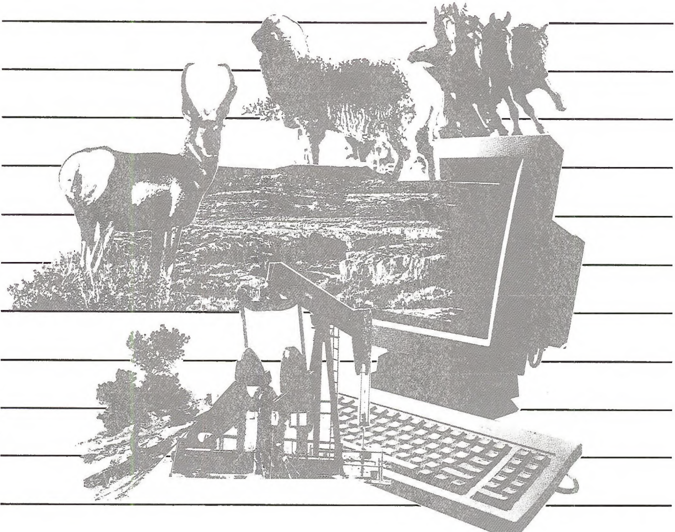
Green River Resource Area 1992

Green River Resource Area Resource Management Plan and Draft Environmental Impact Statement

Volume 2 of 3



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CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter presents the environmental consequences of management actions described in Chapter 2. Both beneficial and adverse effects (impacts) are described.

Impacts to or from wilderness study areas, wilderness values, and related management are not addressed in this document. This discussion can be found in the Rock Springs District Final Wilderness EIS (USDI 1990b) or the Adobe Town-Ferris Final Wilderness EIS (USDI 1987a).

Assumptions used in analyzing the environmental consequences are described in this chapter and are based on previous events, experience of personnel, and knowledge of the resources in the planning area.

Impacts described in this chapter are estimates based on the alternatives. In some cases, existing data were used; in others, very little data were available. Lack of data has contributed a degree of uncertainty to the impact estimates. However, the alternatives include professional judgments and projections of anticipated actions and levels that provide an adequate and reasonable range for analysis.

The chapter is arranged to address impacts to all resource elements for each particular alternative. The impact analysis for Alternative A (the No Action Alternative) was prepared first, and contains some of the more detailed discussion of impacts that the other alternatives use for comparison. However, as in Chapter 2, the Preferred Alternative was listed first to enable the reader to identify the preferred action alternative easily. Actions Common to All Alternatives were taken into account in analyzing the impacts for each alternative. In addition, impact causes and relationships common to all alternatives are included within this analysis (Appendix 12). Table 2-2 is a summary comparison of the estimated total impacts of each alternative.

For the purpose of analysis, short-term impacts described in this document are those that would last 10 years or less; long-term impacts would last 10 years or more. Irreversible or irretrievable commitments of resources and unavoidable adverse effects are discussed in the text if they would occur. Similarly, effects on a given environmental component caused by a particular management action are discussed if they would occur. Otherwise, such effects are not discussed.

ASSUMPTIONS AND ASSESSMENT GUIDELINES

The following assumptions apply to all analyses presented in this chapter.

The BLM would comply with applicable laws, regulations, and policies in implementation of a resource management plan. The effects discussed in the analysis are those that would result from management decisions, not those that would result from compliance with laws, regulations, and policies. Management actions would be implemented as stated, and funding and personnel would be adequate to carry out the actions. Standard operating procedures would be followed in plan implementation. Some of these procedures are summarized in the appendices to this document.

The assumption and analysis guidelines listed below were utilized to assess impacts to all of the alternatives. Generally, a 20-year period with the base year as 1990 was used in preparing assumptions for each resource.

Cultural and Paleontological

The overall density of archeological sites in the planning area is approximately 3.2 sites per 640 acres. Of that number, about one-third prove to be significant in terms of National Register of Historic Places criteria. This density is based on less than 5 percent of the planning area inventoried at a Class III level intensity. Areas of site density as high as 15 sites per section have been found.

The Bureau's preferred method of handling cultural resources in the context of public land development would be to avoid the cultural site. However, when avoidance would be detrimental to other resource values, mitigation methods would be considered. Mitigation by data recovery may be an acceptable management practice for sites that are eligible for the National Register of Historic Places under criteria D, because of the scientific data they contain. While data recovery may adversely affect the cost or timely completion of a specific action, it may be beneficial to the overall resource base because it adds to the understanding of prehistory or history and enables BLM to better manage the totality of cultural resources in the planning area.

Most of the paleontological fossils that are scientifically significant would be associated with the formations of the Tertiary period, with most fossils being found in the Bridger and Green River Formations, and occasionally in the Fort Union and Wasatch Formations. These would include mammal, reptile, bird, fish, and possibly amphibian fossils.

The BLM would continue to receive requests to allow scientific research and collection. From 3 to 6 requests a year would come from universities, museums, paleontologists, and other people and institutions engaged in paleontological research.

Fire

It is assumed that lightning patterns would remain the same and that there exists a relationship between lightning fires and current vegetation patterns associated with known lightning belts. Further, it would be assumed that there exists a relationship between person-caused fires and density of use and that the current annual average of 100 acres (33 occurrences, all ignition sources) burned due to wildfire would continue.

Lands and Realty

Based on the experience of the past 10 years, approximately 2,000 acres of land would be disposed of by sale/exchange and 1,000 acres would be transferred through the R&PP process. The majority of all transfers would occur within the checkerboard and around populated areas or industrial sites. Acquisition of lands with important resource values would be pursued.

Based upon past history, 41,000 acres are under right-of-way authorization yearly. The number of rights-of-way, permits, and leases issued over a 20-year period averages 877. These figures would not include Applications for Permit to Drill (roads or pipelines) or coal actions authorized under a coal lease.

The majority of pipelines, road rights-of-way, and permits are located in association with oil and gas production areas in the Little Colorado Desert, Greater Nitchie Gulch, and the Wamsutter Arch areas. The remaining authorizations are associated with populated areas or industrial sites within the checkerboard land pattern.

Right-of-way corridor areas have not been designated, but ½ mile wide windows have been identified in areas suitable for right-of-way construction.

Revocation of any withdrawals would open those lands to disposal and mineral location, unless those lands are otherwise withdrawn (e.g., a withdrawal to protect an ACEC which is also located within the oil shale withdrawal). Any final revocation of the land and mineral withdrawals is projected to the year 2000. See Table 2-7 for approximate acreages of affected lands. The 21,368 acres of public water reserves would be canceled.

Livestock Grazing

The acres and miles of disturbance for improvements are estimates based on each improvement's estimated location and approximate distance. The Rangeland Program Summary Update (September 1990) proposed management actions for each allotment. Additional rangeland improvements were determined to be necessary to reach the overall goals and objectives in each allotment management plan. A summary of these improvements shows 6 water wells, 20 miles of water pipeline, 36 reservoirs, 27 miles of new fence, 2 spring developments, 43 miles of fence reconstruction, and 10 troughs would be required to implement nine new AMPs and 10 existing AMPs.

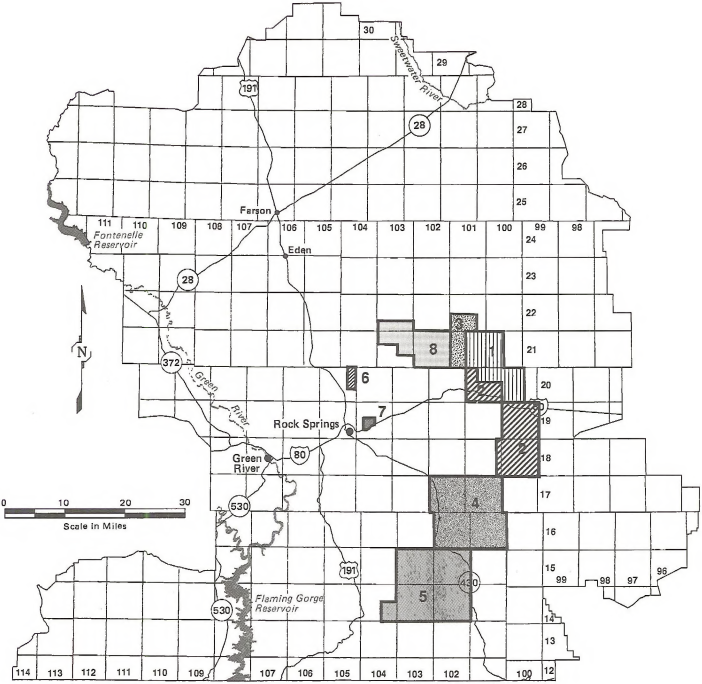
Construction of fences, pipelines, water wells, troughs, and reservoirs would cause a loss of some soil and vegetation. Vegetation would be reestablished along fences and pipelines (approximately 747 acres) within 3 to 5 years. Sites of water wells, troughs, and reservoirs (approximately 77 acres) would remain disturbed for the long term (10 to 20 years) and would be revegetated upon abandonment.

Prescribed burns would cause a loss of vegetation for a period of one to two years and a change in vegetation for 15 to 30 years. Burn areas would be rested from livestock grazing for the first two growing seasons following prescribed burns.

Minerals

Coal Potential

Areas that have high coal interest and development potential are the Beans Spring/PIO (Elk Butte), Deadman Wash, Deer Butte, and the Cooper Ridge areas (Map 74. Table 4-1 shows estimated coal reserves for each high development potential area and for each active mine.



▥ 1 Bridger

▨ 2 Black Butte/Pit 22

▒ 3 Deadman

▒ 4 Cooper Ridge

▒ 5 Beans Spring/PIO (Elk Butte)

▨ 6 Pilot Butte

■ 7 Lion Coal

▒ 8 Deer Butte

Map 74
Projected Coal Development
Green River Planning Area

TABLE 4-1

ESTIMATED COAL RESERVES BY TRACT AREA

Tract Area	Mineable (Million Tons)	Recoverable (Million Tons)
Bridger	174.7	149.5
Black Butte/Pit 22	177.1	159.4
Deadman Wash	23.5	21.0
Cooper Ridge	59.0	53.0
Elk Butte (Beans Spring/PIO)	65.2	58.4
		(34.4)
		(24.0)
Pilot Butte	132.0	66.0
Lion Coal	1.2	0.6
Deer Butte	56.0	50.5
Totals	**688.7**	**558.4**

In the Deadman Wash area, about 3,500 acres of public lands would be considered for lease (the Deadman Wash tract being considered contains about 8,040 acres of public and private lands). The lands being considered contain about 36 million tons of recoverable coal reserves (14.9 million tons are on public lands and 21.6 million tons are on private lands).

In the Beans Spring area, about 8,282 acres of public lands would be considered for lease through a Preference Right Lease Application (PRLA). The Beans Spring application area contains about 5,280 acres of state lands in addition to the public lands. The PRLA area contains about 34.4 million tons of recoverable coal reserves (28.6 million tons are on public lands and 5.8 million tons are on state lands).

Present Coal Operations

The planning area presently has two companies operating strip surface coal mines and two companies operating underground coal mines (Map 74). Surface disturbance within the Bridger Coal mine area averages 200 acres per year with 100 acres being returned to predisturbance condition (Table 4-2). Bridger would have approximately 5,000 acres to reclaim at the end of mine life and is expected to have this acreage reclaimed within 3 years. Total surface disturbance is expected to be about 10,000 acres for life of mine operation. Existing mines would continue to operate, and areas of potential would be defined as lease tracts.

Surface disturbance within the Black Butte/Pit 22 mine area averages 300 acres per year with 200 acres being returned to predisturbance condition (Table 4-3). Black Butte (Pit 22) would have approximately 5,000 acres to reclaim at the end of mine life and is expected to have this acreage reclaimed and a stand of vegetation established within 3 years. Total surface disturbance is expected to be 6,000 acres.

The Lion Coal mine has very little surface disturbance, less than 1 acre per year, and facilities and roads consist of approximately 5 acres (Table 4-4). The 7 acres of total disturbance would be reclaimed by 2001.

The Pilot Butte mine (formerly the Stansbury Mine) has very little surface disturbance (less than 5 acres in the last 10 years) with the main disturbance attributed to the mine's early years of operation (Table 4-5). Facilities, roads, and railway have disturbed 197 acres since operations began, with the railway and roads being 177 acres of this total disturbance. Total surface disturbance would be about 200 acres that would be reclaimed and a stand of vegetation established within 3 years after mining stops.

TABLE 4-2

BRIDGER COAL MINE SURFACE MINE OPERATION[1]

Year	Acres Disturbed	Total Disturbed[2]	Total Acreage Reclaimed[3]	Unreclaimed
1990	291[4]	5,371	1,246	4,125
1991	235	5,536	1,336	4,200
1992	300	5,836	1,526	4,310
1993	400	6,236	1,776	4,460
1994	400	6,636	2,071	4,565
1995	350	6,986	2,296	4,690
1996	390	7,376	2,586	4,790
1997	200	7,576	2,886	4,690
1998	150	7,726	3,176	4,550
1999	190	7,916	3,666	4,250
2000	175	8,091	3,891	4,200
2001	200	8,291	4,141	4,150
2002	125	8,416	4,376	4,040
2003	160	8,576	4,466	4,110
2004	160	8,736	8,536	4,200
2005	230	8,966	4,716	4,250
2006	210	9,176	4,776	4,400
2007	110	9,286	4,776	4,510
2008	150	9,436	4,841	4,595
2009	100	9,536	4,876	4,660
2010	115	9,651	4,941	4,710
2011	110	9,761	4,981	4,780

[1] Mine life is anticipated to extend beyond 2011.

[2] Part of this has been reclaimed. Subtracted Total Acreage Reclaimed from Total Disturbance to obtain Unreclaimed figure.

[3] Adjustments for 3-year stabilization have been made.

[4] Actual acres disturbed.

TABLE 4-3

BLACK BUTTE/PIT 22 MINE SURFACE MINE OPERATION[1]

Year	Acres Disturbed	Total Disturbed[2]	Total Acreage Reclaimed[3]	Unreclaimed
1990	427[4]	8,350	3,150	5,200
1991	400	8,525	3,200	5,325
1992	350	8,825	3,400	5,425
1993	335	9,160	3,635	5,525
1994	268	9,428	4,346	5,082
1995	307	9,735	5,096	4,639
1996	277	10,012	5,773	4,239
1997	308	10,320	6,347	3,973

TABLE 4-3 (Continued)

BLACK BUTTE/PIT 22 MINE SURFACE MINE OPERATION[1]

Year	Acres Disturbed	Total Disturbed[2]	Total Acreage Reclaimed[3]	Unreclaimed
1998	313	10,633	7,316	3,317
1999	287	10,920	8,277	2,643
2000	307	11,227	8,487	2,740
2001	273	11,500	8,640	2,860
2002	295	11,795	8,850	2,945
2003	330	12,125	9,085	3,040
2004	275	12,400	9,070	3,330
2005	300	12,700	9,159	3,541
2006	320	13,020	9,315	3,705
2007	305	13,325	9,840	3,485
2008	275	13,600	10,300	3,300
2009	305	13,905	10,505	3,400
2010	300	14,205	10,701	3,504
2011	295	14,500	10,800	3,700

[1] Mine life is anticipated to extend beyond 2011.

[2] Total disturbed to end of mine life (16,000 acres) includes Pit 22 mine.

[3] Adjustments for 3-year stabilization have been made.

[4] Actual acres disturbed.

TABLE 4-4

LION COAL MINE UNDERGROUND MINE OPERATION

Year	Acres Disturbed[1]	Total Disturbed	Total Acreage Reclaimed[2]	Unreclaimed
1990		5		5
1991				
1992				
1993				
1994	1	6	0	6
1995				
1996				
1997	1	7	0	7
1998				
1999				
2000				
2001		7	7	0[3]
2002				
2003				
2004				
2005				
2006				

TABLE 4-4 (Continued)

LION COAL MINE
UNDERGROUND MINE OPERATION

Year	Acres Disturbed[1]	Total Disturbed	Total Acreage Reclaimed[2]	Unreclaimed
2007				
2008				
2009				
2010				
2011				

---

[1] Disturbance equates to new air shafts.

[2] Adjustments for 3-year stabilization have been made.

[3] Assume end of mine life.

TABLE 4-5

PILOT BUTTE MINE
UNDERGROUND MINE OPERATION[1]

Year	Acres Disturbed	Total Disturbed	Total Acreage Reclaimed[2]	Unreclaimed
1990		197	0	197
1991		197	0	197
1992				
1993				
1994				
1995	2	198	0	198
1996				
1997				
1998	2	200	0	200
1999				
2000	1	200	0	201
2001	5	205	2	203
2002	1	206	2	204
2003	1	207	2	205
2004				
2005				
2006				
2007	1	208	2	206
2008				
2009				
2010	2	210	2	208
2011				

---

[1] Mine life is anticipated to extend beyond 2011.

[2] Adjustments for 3-year stabilization have been made.

Potential New Coal Operations

Coals from the planning area have received various degrees of interest over the years due to their low sulfur content and moderate BTU values. Recently, renewed interest in the Deadman Wash tract (previously the Leucite Hills tract in the Green River/Hams Fork Draft EIS) has caused exploration on public and private lands. Recent settlement of environmental litigations concerning the Beans Spring tract Preference Right Lease Applications has brought it to the forefront in interest, and the Cooper Ridge and Deer Butte areas remain as locations of high interest for future coal development.

The areas with high interest and development potential could begin strip mining operations within the next 5 to 15 years if these lands are leased and economic conditions warrant. Table 4-6, Table 4-7, Table 4-8, and Table 4-9 were prepared to project surface disturbance impacts if any one of these areas is mined.

TABLE 4-6

DEADMAN WASH MINE SURFACE MINE OPERATION[1]

Year	Acres Disturbed	Total Disturbed	Total Acreage Reclaimed[2]	Unreclaimed
1990				
1991				
1992				
1993				
1994				
1995	100	100	0	100
1996	125	225	0	225
1997	210	435	60	375
1998	190	625	65	500
1999	150	775	75	575
2000	220	995	110	685
2001	135	1,130	35	785
2002	180	1,310	240	725
2003	175	1,485	90	775
2004	120	1,605	45	850
2005	160	1,765	80	930
2006	35	1,800	0	965[3]
2007	0	1,800	965	0
2008				
2009				
2010				
2011				

[1] Mine life could extend beyond 2011 at lower production levels.

[2] Adjustments for 3-year stabilization have been made.

[3] Assume end of mine life.

TABLE 4-7

ELK BUTTE (BEANS SPRING/PIO) MINE SURFACE MINE OPERATION[1]

Year	Acres Disturbed	Total Disturbed	Total Acreage Reclaimed[2]	Unreclaimed
1990				
1991				
1992				
1993				
1994				
1995				
1996				
1997				
1998				
1999				
2000				
2001				
2002				
2003				
2004				
2005	100	100	0	100
2006	150	250	0	250
2007	100	350	0	350
2008	200	550	0	550
2009	200	750	50	700
2010	130	880	90	740
2011	200	1,080	150	790

[1] Mine life is anticipated to extend beyond 2011.

[2] Adjustments for 3-year stabilization have been made.

TABLE 4-8

COOPER RIDGE MINE SURFACE MINE OPERATION[1]

Year	Acres Disturbed	Tota Disturbed	Total Acreage Reclaimed[2]	Unreclaimed
1990				
1991				
1992				
1993				
1994				
1995				
1996				
1997				
1998				
1999				
2000				
2001				

TABLE 4-8 (Continued)

COOPER RIDGE MINE SURFACE MINE OPERATION[1]

Year	Acres Disturbed	Tota Disturbed	Total Acreage Reclaimed[2]	Unreclaimed
2002				
2003				
2004				
2005				
2006	120	120	0	120
2007	140	260	0	260
2008	180	440	80	360
2009	210	650	100	470
2010	200	850	100	570
2011	200	1,050	160	610

[1] Mine life is anticipated to extend beyond 2011.

[2] Adjustments for 3-year stabilization have been made.

TABLE 4-9

DEER BUTTE MINE SURFACE MINE OPERATION[1]

Year	Acres Disturbed	Tota Disturbed	Total Acreage Reclaimed[2]	Unreclaimed
1990				
1991				
1992				
1993				
1994				
1995				
1996				
1997				
1998				
1999				
2000				
2001				
2002				
2003				
2004				
2005				
2006				
2007				
2008	60	60	0	60
2009	100	160	0	160
2010	140	300	0	300
2011	200	500	110	390

[1] Mine life is anticipated to extend beyond 2011.

[2] Adjustments for 3-year stabilization have been made.

Exploration drilling has been completed on all active mines, and drilling has recently been completed on the Deadman Wash area with a net disturbance of 25 acres for roads and drill pads. The Elk Butte (Beans Spring and PIO areas) area has had exploration drilling. Total disturbance from this drilling was approximately 160 acres for Beans Spring and 40 acres for PIO. This disturbance has been reclaimed for more than 3 years. Additional drilling would be required in the PIO area with a total disturbance of 10 acres expected for roads and drill pads. Road disturbance is expected to be 16,000 linear feet. These areas would be reclaimed and a stand of vegetation established within three years.

The Beans Spring and PIO mine properties each are assumed to have a life of mine disturbance of about 5,000 acres. This acreage includes all facilities, roads, etc. Each mine is expected to be in operation within 10 years from award of lease.

The Deadman Wash life of mine disturbance would be dependant upon the company that is successful in being awarded the competitive lease. If one of the two local companies should be awarded the lease, then the life of mine disturbance would be less than if a new company should be awarded the lease. It is assumed the life of mine disturbance for a new company would be 2,500 acres while one of the two companies presently mining in the area would have a life of mine disturbance of 2,000 acres. The 500 acres difference is the need for facilities for a new company that an existing company would already have in the area. At the end of mine life, there would remain 1,000 to 1,500 acres to reclaim.

The Deadman Wash mine could be active within 2 to 5 years from award of lease to one of the two local companies. If the lease is awarded to a new company, it is assumed it would take 8 to 10 years to put the mine in operation. Annual production is anticipated to be 1 million tons.

Personnel to operate any and all mines would come from local communities. It is assumed that if one of the two local companies were awarded the lease for Deadman Wash, from zero to 100 employees may be needed. If the lease was awarded to a new company, it is assumed that up to 250 employees may be needed. The Beans Spring and PIO mines each are estimated to need 150 employees. If these two mines are operated as one unit (Elk Butte), approximately 250 employees would be needed. (The PIO of Elk Butte is not projected to be developed over the next 20 years. However, for planning and coal reserve purposes, it is included as an integral part of the coal program.)

Sodium Potential

There is some potential for development of a new sodium solution mine that would be located within the south half or on the fringe of the Known Sodium Leasing Area. Table 4-10 presents surface disturbance that would be associated with this type of mining. The sodium brine area of potential for recovery of sodium is shown on Map 18. Facilities for this operation would probably be located within the W1/2, Section 28, T. 24 N., R. 106 W. (USDI 1990 a).

TABLE 4-10

HYPOTHETICAL SODIUM SOLUTION MINE (100,000 ton/year potential)

Year	Production (100,000) tons	Disturbance	Reclaimed	Total Disturbance	Total Reclaimed	Total Remaining Disturbance
1996	0	2	0	2	0	2.0
1997	100	7	0.5	9	0.5	8.5
1998	200	4	4.5	13	5.0	8.0
1999	300	4	2.0	17	7.0	10.0
2000	500	6	2.0	23	9.0	14.0
2001	700	3	4.0	26	13.0	13.0
2002	900	7	2.0	33	15.0	18.0
2003	1,000	4	4.5	37	19.5	17.5
2004	1,000	6	2.0	43	21.5	21.5
2005	1,000	3	2.0	46	23.5	22.5
2006	1,000	5	4.0	51	27.5	23.5
2007	1,000	4	2.0	55	29.5	25.5
2008	1,000	3	4.5	58	34	24.0
2009	1,000	1	2.0	59	36	23
2010	1,000	2	5.9	61	41.9	19.1
2011			19.1			

Sodium Production

About 5 million tons of trona is expected to be mined each year from within the planning area boundary (3.2 tons from Rhone-Poulenc; 0.9 tons from Texasgulf; and 0.9 tons from FMC), or 100 million tons over the next 20 years. If a sodium solution mine were to be developed, an additional 100,000 tons per year could be expected to be recovered. There are no production estimates available for sodium brine development.

Oil and Gas Potential

The planning area is considered to have a high potential for the occurrence of oil and gas. This rating considers a variety of geologic characteristics, including:

1. Presence of hydrocarbon source rocks.
2. Presence of reservoir rocks with adequate porosity/ permeability.
3. Potential for structural/stratigraphic traps to exist.
4. Opportunity for migration from source to trap.
5. Other conditions, such as temperature, depth of burial, and subsurface pressures.

Industry input was requested to attempt to evaluate the potential for development of the oil and gas resource through the year 2010. With this information, a determination was made of the potential for development, using high, moderate, and low potential values for each part of the planning area (Map 75).

During the stage of Issue Analysis, it was determined that some parts of the planning area would need additional analysis due to projected high rates of drilling activity or due to conflicts with management of other resource values. The three areas identified for additional analysis (Special Study Areas) were Little Colorado Desert, Greater Nitchie Gulch, and Wamsutter Arch (Map 75). Each area lies within the area mapped as having high potential for development of the oil and gas resource.

Oil and Gas Projected Drilling Activity

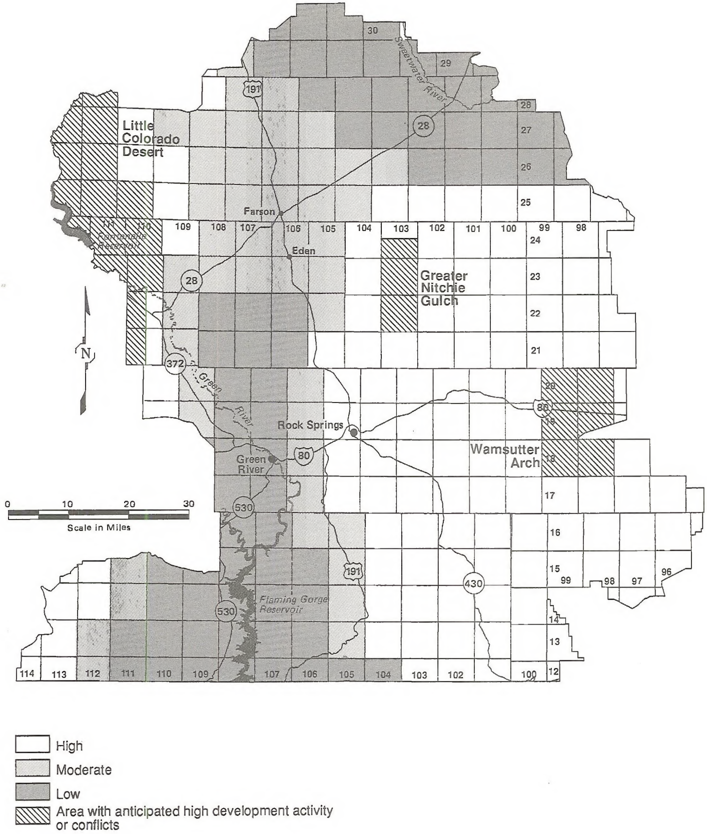
Statistical analysis of drilling and completion data, obtained from Petroleum Information Corporation and BLM files, was used to make projections of drilling activity in the planning area and the 3 Special Study Areas. Appendix 13-1 shows the statistical analysis used to project drilling activity in the planning area for a 20-year period. Data used were the number of wells drilled each year from 1950 to 1989. From these data, analysis indicated that the most probable future projection of well completions would be 1,258 wells. Analysis also indicated that the maximum future projection of well completions would be 2,385 wells. A review of this analysis shows that the maximum future projection is not likely to occur over the next 20 years. The chances of the most probable number of wells being drilled in any one year is less than 1 percent, and the chance that the maximum projection number of wells could be drilled in one year is even more remote. This is also found to be the case when projections are reviewed for each Special Study Area.

The number of projected wells for the entire planning area includes the numbers of projected wells for each of the 3 Special Study Areas. Those wells projected for the planning area but not within the Special Study areas would be scattered throughout the planning area. It is assumed that 2 percent of these scattered wells would be located in low development potential areas, 4 percent would be located in moderate development potential areas, and 94 percent would be located in high development potential areas.

Appendix 13-2 shows the statistical analysis used to project drilling activity in the Little Colorado Desert Special Study Area. Data used were based on the number of wells drilled in this study area between 1957 and 1990. Analysis of these data indicates that the most probable future projection of well completions would be 255 wells and the maximum future projection of well completions would be 510 wells.

Appendix 13-3 analyzes projected drilling activity in the Greater Nitchie Gulch Special Study Area. For this analysis, wells drilled between 1961 and 1990 were used. Statistical analysis indicates that the most probable future projection of well completions would be 42 wells drilled while the maximum future projection of well completions would be 82 wells drilled.

Appendix 13-4 is the analysis of projected drilling activity in the Wamsutter Arch Special Study Area. Data used were based on the number of wells drilled in this area between 1953 and 1990. Analysis of these data indicates that the most probable future projection of well completions would be 94 wells drilled while the maximum future projection of well completions would be 253 wells drilled.



Map 75

Oil and Gas Potential

Green River Planning Area

Petroleum Information Corporation was also used to obtain success ratios for past wells drilled within and near the planning area (Appendix 13-5). In this figure, success ratios are calculated for selected drilling depth ranges and by class. The overall success ratio for all wells drilled is 0.63.

For this analysis, it is assumed that each productive gas well has a life of 20 years and each oil well has a productive life of 50 years. Using this projection and Petroleum Information Corporation's historical well data, projected producing well abandonments for the planning area were developed (Appendix 13-6). This appendix shows the number of abandoned gas and oil producers for each year from 1990 through 2010 and the total number of abandoned producers.

Projected producing well abandonments for each of the 3 Special Study Areas were also determined. Historical well data available in the district for each study area was used instead of Petroleum Information Corporation data.

Oil and Gas Production Rates

A table of projected annual production rates of oil and gas through 2010 was prepared for the planning area (Table 4-11). Production rates were projected for both the Most Probable Future Projection and for the Maximum Future Projection of the number of producing wells. The ratio of oil to gas production was assumed to stay constant through 2010 and each producing well was assumed to produce 398 barrels of oil and 14,975,000 cubic feet of gas annually. This rate was obtained from total production of oil and gas, divided by number of producing wells during 1989.

Oil and Gas Surface Disturbance

These guidelines for access roads, drill pads, and pipelines and powerlines would be used to determine acres of surface disturbance associated with oil and gas exploration and development drilling activities.

Access Roads:

40 feet total disturbance

16-foot-wide travelway

4.8 acres initial disturbance per linear road mile

4.0 acres initial disturbance per access road (less than 1 mile per well)

3.5 acres long-term disturbance per access road per producing well

0.5 acres of access road stabilized per producing well, after 3 years

4.0 acres of access road stabilized per abandoned dry well, after

3 years

3.5 acres of access road stabilized per abandoned producing well, after 3 years

Road standards would be in conformance with guidelines issued in BLM Manual 9113 (Roads) and in Surface Operating Standards for Oil and Gas Exploration and Development (1989).

Drill Pads:

3.5 acres initial disturbance per average well pad

1.0 acre long-term disturbance per producing well

2.5 acres stabilized per producing well, after 3 years

3.5 acres stabilized per abandoned dry well, after 3 years

1.0 acre stabilized per abandoned producing well, after 3 years

Pipelines and Powerlines:

6.0 acres initial disturbance per producing well

5.5 acres stabilized per producing well, after 3 years

0.5 acres long-term disturbance

0.5 acres stabilized per abandoned producing well, after 3 years

Statistics on drilling activity and surface disturbance assumptions were used to project acres of disturbance, stabilization, and net long-term disturbance for the planning area and each of the 3 Special Study Areas. For each of these tables, the Most Probable Future Projection and Maximum Future Projection of drilling activity was used and acreage figures were determined for the period 1990 to 2010.

TABLE 4-11

OIL AND GAS PROJECTED PRODUCTION RATES
(1989-2010)
Green River Resource Area

	Preferred Alternative		Alternative A		Alternative B		Alternative C	
Year	Oil Production (BBLs)[1]	Gas Production (MCF)[2]	Oil Production (BBLs)[1]	Gas Production (MCF)[2]	Oil Production (bbls)[1]	Gas Production (MCF)[2]	Oil Production (bbls)[1]	Gas Production (MCF)[2]
1989	681,376	25,637,200	681,376	25,637,200	681,376	25,637,200	681,376	25,637,200
1990	694,112	26,116,400	694,112	26,116,400	702,470	26,430,875	694,112	26,116,400
1991	704,858	26,520,725	704,858	26,520,725	722,370	27,179,625	704,858	26,520,725
1992	713,614	26,850,175	713,614	26,850,175	740,678	27,868,475	713,614	26,850,175
1993	714,410	26,880,125	714,808	26,895,100	751,822	28,287,775	714,012	26,865,150
1994	723,166	27,119,725	723,564	27,224,550	771,324	29,021,550	722,370	27,179,625
1995	720,778	27,119,725	720,778	27,119,725	780,080	29,351,000	719,584	27,074,800
1996	725,554	27,299,425	725,952	27,314,400	796,796	29,979,950	723,962	27,239,525
1997	719,584	27,074,800	720,380	27,104,750	803,164	30,219,550	717,992	27,014,900
1998	710,430	26,730,375	711,624	26,775,300	807,940	30,399,250	708,838	26,670,475
1999	702,470	26,430,875	704,460	26,505,750	813,512	30,608,900	700,838	26,370,975
2000	686,550	25,831,875	688,938	25,921,725	812,318	30,563,975	684,958	25,771,975
2001	683,764	25,727,050	686,550	25,831,875	823,860	90,998,250	682,172	25,667,150
2002	674,212	25,367,650	677,794	25,502,425	829,830	31,222,875	672,620	25,307,750
2003	659,088	24,798,600	662,670	24,933,375	830,626	31,252,825	657,496	24,738,700
2004	659,088	24,798,600	663,466	24,963,325	846,944	31,866,800	657,496	24,738,700
2005	664,660	25,008,250	662,670	24,933,375	869,630	32,720,375	663,068	24,948,350
2006	673,416	25,337,700	678,590	25,532,375	895,500	33,693,750	671,824	25,277,800
2007	671,426	25,262,825	677,396	25,487,450	911,818	34,307,725	669,834	25,202,925
2008	668,640	25,158,800	675,008	25,397,600	927,738	34,906,725	667,048	25,098,100
2009	667,446	25,113,075	674,610	25,382,625	945,648	35,580,600	665,854	25,053,175
2010	625,258	23,525,725	632,024	23,780,300	921,768	34,682,100	623,666	23,465,825

[1] Annual production per well = 398 BBLs of oil.

[2] Annual production per well = 14,975 MCF of gas.

Assumptions: 1,712 wells producing in 1989. Oil and gas production will remain the same.

Hydrogen Sulfide Risk Analysis

An analysis of the risk of exposure to hydrogen sulfide was prepared (Appendix 7-6). During analysis of issues, the risk of hydrogen sulfide exposure in populated areas was identified as a public issue. Statistical analysis indicates that there is a 1 in 1,000,000 chance that over the next 20 years one or more well blowouts would occur, causing exposure to 500 ppm of hydrogen sulfide at distances of more than one mile from a drilling well, producing location, or processing facility containing this gas.

Oil and Gas Produced Water Disposal Methods

1. Reinjection

2. Disposal pits - estimated 0.1 acre each

3. Discharge (DEQ water quality standards would be met)

Coalbed Methane Potential and Projected Drilling Activity

A Reasonable Foreseeable Development Scenario for Coalbed Methane was prepared for the planning area (Stilwell 1991). This report indicated that known Tertiary and Upper Cretaceous coalbeds in the planning area have been found to contain methane. The coalbeds themselves are the source rock and potential reservoir for methane. Also, thermal maturation appears to have progressed far enough to generate methane and adequate permeabilities and porosities are present in the coalbeds. For these reasons, near surface occurrences of Tertiary and Upper Cretaceous coalbeds (outcrop to a depth of about 5,000 feet) have been assigned a high potential for occurrence of coalbed methane (Map76 and Map 77). Those parts of the planning area underlain by Tertiary and Upper Cretaceous rocks, at depths below 5,000 feet, were assigned a moderate potential. On the crest of the Rock Springs Uplift, where these coalbeds have been eroded and are no longer present, an area designated as no potential was mapped.

Potential for development of the resource was also addressed and an area of high potential development was assigned. Coalbed methane development activity is expected to occur in a limited area from 1990 through 2000 (Map 78). During this period, between 37 and 300 wells could be drilled. The Minimum Future Projection of 37 wells drilled is expected to occur if significant reserves of coalbed methane are not discovered. The assumed success ratio at this projection is 0.15.

If coal gas areas presently being explored are determined to be economically productive, development activity would increase to 300 wells. This is assumed to be the Most Probable Future Projection of activity in the planning area. At this activity level, the success ratio is expected to be 0.80. It is assumed that 98 percent of the wells projected to be drilled at the 37 well and 300 well activity levels would be drilled within the area delineated on Map 78. The remaining 2 percent of these wells would be scattered throughout the planning area.

Coalbed Methane Surface Disturbance

These guidelines for access roads, drill pads, and pipelines and powerlines would be used to determine acres of surface disturbance associated with coalbed methane exploration and development drilling activities.

Access Roads:

40 feet total disturbance

16-foot-wide travelway

4.8 acres initial disturbance per linear road mile

4.8 acres initial disturbance per well drilled

4.0 acres long-term disturbance per producing well

0.8 acres stabilized per producing well, after 3 years

4.8 acres stabilized per abandoned dry well, after

3 years

4.0 acres stabilized per abandoned producing well, after 3 years

Road standards would be in conformance with guidelines issued in Bureau Roads Manual 9113 and in Surface Operating Standards for Oil and Gas Exploration and Development (1989).

Drill Pads:

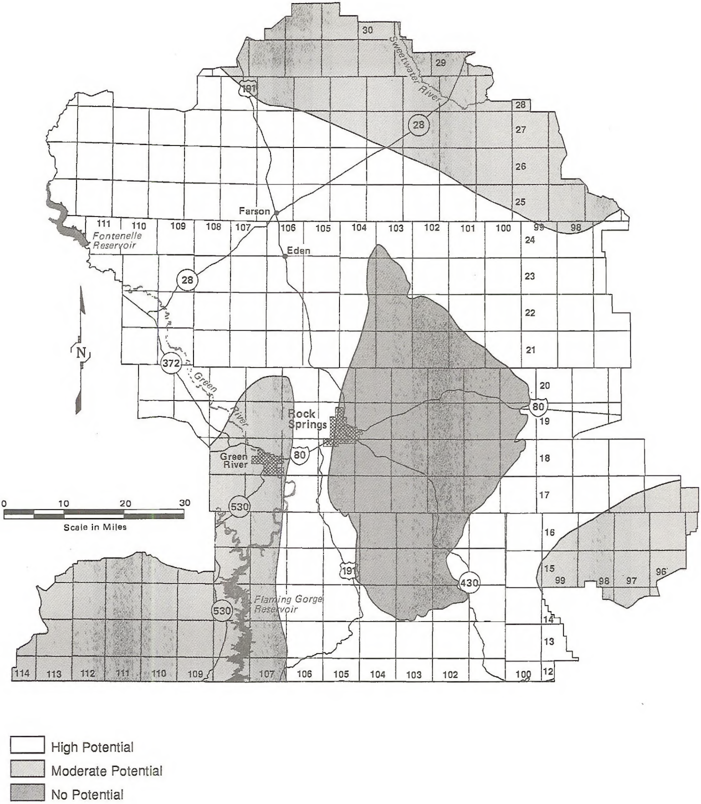
3.0 acres initial disturbance per average well pad

1.0 acre long-term disturbance per producing well

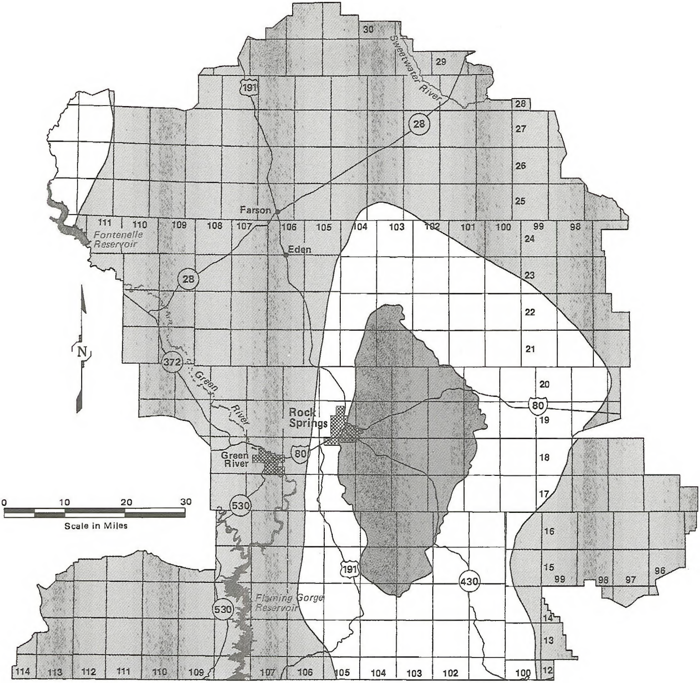
2.0 acres stabilized per producing well, after 3 years

3.0 acres stabilized per abandoned dry well, after 3 years

1.0 acre stabilized per abandoned producing well, after 3 years



Map 76
Potential for Occurrence of
Tertiary Coalbed Methane
Green River Planning Area

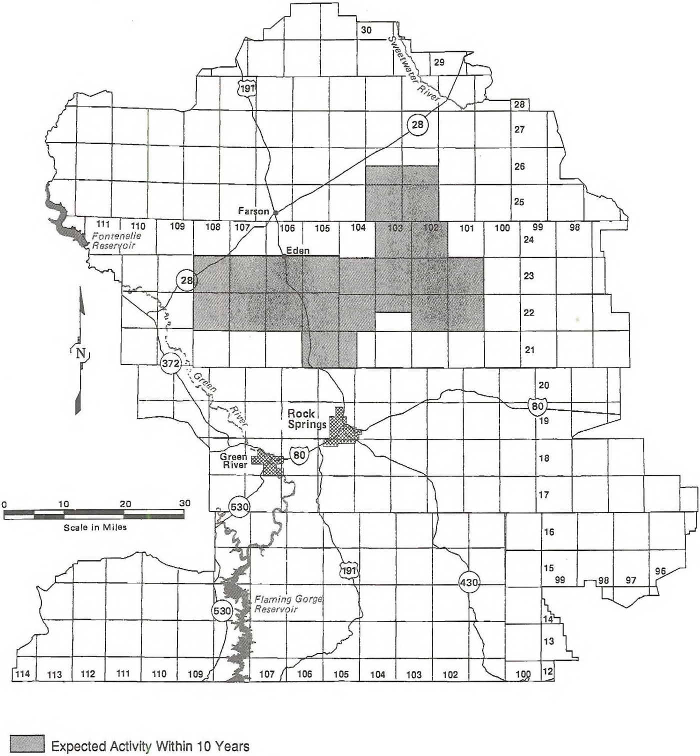


▭ High Potential

▨ Moderate Potential

■ No Potential

Map 77
Potential for Occurrence of
Upper Cretaceous Coalbed Methane
Green River Planning Area



Map 78

Coalbed Methane Developement Potential

Green River Planning Area

Pipelines and Powerlines:

6.0 acres initial disturbance per producing well

5.5 acres stabilized per producing well, after 3 years

0.5 acres long-term disturbance per producing well

0.5 acres stabilized per abandoned producing well, after 3 years

Projections of drilling activity and surface disturbance assumptions were used to project acres of disturbance, stabilization, and net long-term disturbance for the planning area. The Minimum Future Projection and a Most Probable Future Projection of drilling activity were used and acreage figures were determined for the period 1990 to 2000.

Coalbed Methane Production

Appendix 13-7 was prepared to analyze the amount of production that would be required to economically produce a coalbed methane well, in the planning area, with and without the current coalbed methane tax credit. It was found that a production rate of 225,000 cubic feet of gas per day would be required to produce a coalbed methane well without application of the tax credit. If the tax credit were applied on a coalbed methane well, 133,000 cubic feet of gas per day would need to be produced to make an economic well.

Coalbed Methane Spacing

For up to 100 wells, 160-acre spacing would be used. For up to 200 wells, 320-acre spacing would be used.

Coalbed Methane Produced Water Disposal Methods

1. Reinjection
2. Disposal ponds - estimated 2 acres each
3. Discharge (DEQ water quality standards would be met)
4. Treatment with a portion disposed of in ponds and a portion discharged (DEQ water quality standards would be met)

Mineral Materials

Requests would continue to be received for Free Use Permits for mineral materials (usually gravel and/or borrow material) from other Federal agencies, State agencies, and local and city governments. Most of this material would be used for maintenance and/or expansion of existing road and highway systems. The total amount of material requested would vary from 30,000 to 800,000 cubic yards a year.

Requests would continue to be received for Negotiated Sales of gravel, crushed rock, or other road base from private companies and individuals. Most of this material would be used to build or maintain access roads associated with well sites, other oil and gas projects, coal mines, and trona plants. Some would be used for building projects of private individuals. The amount of material sold would range from 1,000 to 50,000 cubic yards of gravel or crushed rock a year.

Expansion of existing mineral material sites (gravel) and the development of new sources would be counterbalanced by reclamation activities; therefore, the amount of surface disturbance (approximately 1,080 acres) would remain relatively constant. Requests for topsoil, moss rock, building stone, and flagstone would continue to be received from the public for home improvement (about 10 to 50 inquiries a year).

The location and size of borrow pits would depend mostly on the location of a building project (the largest user of borrow material would continue to be the Wyoming Highway Department). Suitable borrow material can be found throughout the planning area.

The location and size of gravel pits would depend on the location and size of a given building project and the quantity and quality of material needed for that project. The areas having the most potential for containing a large amount of gravel are marked on Map 65. These areas have the highest probability for the development of a gravel pit. Some potential for gravel pits exists outside of the areas marked (not every gravel deposit is noted on the map).

Mining Law - Claim Activity

Many of the operators and claimants who have submitted Plans, Notices, and/or Annual Assessment Work would continue to do so at a rate of 4 to 10 per year. Those claims presently being held by mining claimants would continue to be held. New mining claims would continue to be filed on lands within the planning area at a rate of 1 to 10 per year.

Lands which are most likely to have new mining claims located on them include:

a) areas covered by igneous and metamorphic rocks.

b) areas covered by Tertiary age rocks.

c) areas that are open to mineral location but are non-mineral in character, to be used for the location of millsites. These could be located almost any place in the planning area that is not within a withdrawal.

No more than 1 to 10 acres a year would be disturbed due to exploration activity.

Mining Law - Production

Although there is low potential for a gold or jadeite mine to be developed, the most likely area for these mines would be located in the Wind River Front area. The jadeite mine has the potential for recovering as much as 500 tons of ore per year with a minor amount of surface disturbance (Table 4-12). As much as 320,000 tons per year of ore could be processed during the development of a gold mine. The area of gold mine disturbance would be about 53 acres over its life (Table 4-13).

TABLE 4-12

HYPOTHETICAL JADEITE MINE
(500 tons/year potential)

Year	Production (tons)	Disturbance	Reclaimed	Total Disturbance	Total Reclaimed	Total Remaining Disturbance
1994	200	3	—	3	0	3
1995	500	1	—	4	0	4
1996	500	1	—	5	0	5
1997	500	—	—	5	0	6
1998	500	—	1	5	1	5
1999	500	1	—	6	0	5
2000	500	—	—	6	0	5
2001	200	1	1	6	2	4
2002	100	4	4	6	6	0

TABLE 4-13

HYPOTHETICAL GOLD MINE
(.100z/ton)
(320,000 ton mine - 11-year-life)

Year	Production (000)	Disturbance	Reclaimed	Total Disturbance	Total Reclaimed	Total Remaining Disturbance
1996	150	10	—	10	—	10
1997	200	4	—	14	—	14
1998	275	4	2	18	2	16
1999	320	6	4	24	6	18
2000	320	5	2	29	8	21
2001	320	5	5	34	13	21
2002	320	8	6	42	19	23
2003	320	4	7	46	26	20
2004	320	2	7	48	33	15
2005	250	4	10	52	43	9
2006	175	1	5	53	48	5
2007	0	—	5	53	53	0

Off-Road Vehicles

The Sand Dunes area would continue to operate as an open ff-road vehicle play area. Use is increasing and it is anticipated that facilities such as a campground, water, picnic area, and loading-unloading ramps would be constructed.

The planning area has had applications for off-road events such as hill climbs and cross-country races. These have been denied in the past. Off-road events in the California and Nevada desert continue to be reduced due to conflicts with desert tortoise habitat. More pressure from off-road groups for these activities would be felt in the form of applications and requests.

Signing and enforcement of off-road vehicle plans would continue or be initiated.

Recreation Resource

Seven permits are issued annually for commercial big game hunting and one permit is issued for mountain bike outfitting. In addition, 1 permit is authorized for a mountain bike race in Rock Springs and 1 is issued to the National Outdoor Leadership School for an outdoor education class. In the future, the special recreation permit process may fluctuate based on demand.

Camping for recreational purposes would be limited to 14 days. People presently engage in recreational activities in the planning area in a dispersed manner. This trend would continue to increase even after more developed sites are constructed.

Bear bait permits are not issued at this time and it is not anticipated that they would be in the future.

Recreation at the Fontenelle Reservoir site is currently being managed by the BLM on an interim basis. No new facilities are planned on the Green River. A river management plan would be written.

Future recreation use would increase in the planning area. State and local tourism boards are placing emphasis on keeping visitors in the area an extra day as they travel to and from Yellowstone and Grand Teton National Parks, and the Flaming Gorge National Recreation Area.

BLM initiatives such as Recreation 2000, Fish and Wildlife 2000, and the Adventures in the Past programs are gaining national recognition. Visitors are discovering the unique and valuable resources on BLM-administered lands in the area. People are interested in visiting the hundreds of miles of historic trails. Congress is moving towards designating wilderness in the area that would attract visitors who seek solitude and opportunities for unconfined recreation. The area is nationally recognized for its outstanding hunting and fishing opportunities. The backcountry byways program would encourage motorists to travel over hundreds of miles of BLM roads passing by and visiting the diverse and unique resources that these lands have to offer.

Socioeconomics

There are certain levels of output per oil and gas well that must be achieved to result in an economically viable producing well. If producers are helped by tax credits (e.g., Crude Oil Windfall Tax Act of 1980), then the coalbed methane wells need produce about 133,000 cubic feet per day to be viable. If no tax credit exists, the wells would need to produce 225,000 cubic feet per day to be economically viable.

Since there is no way of knowing at this point the actual output/well, the minimum output figure was used in each case as the lowest viable output possible from the proposed wells. Therefore, in the no tax credit example, area wells are all estimated to be producing at 225,000 cubic feet per day, and in the tax credit example area wells are all estimated to be producing at the lower minimum of 133,000 cubic feet per day. This assumes that wells would not be eligible for tax credits unless they were expected to produce below the 225,000 cubic feet per day output level. This means that, conceivably, wells could produce higher output levels than are used here but could not produce at any lower levels and still be economically viable at a price of $1.00 per thousand cubic feet.

Base year 1990 coal output and related output values would be 11.9 million tons and $212 million, respectively.

Vegetation

Two precipitation zones cover 98 percent of the planning area. In the 7 to 9 inch zone of annual precipitation, stabilizing vegetative ground cover would occur in 2 to 3 years. Brush establishment/invasion to create a vegetative landscape similar to the adjacent lands would occur in 15 to 20 years. In the 10 to 14 inch zone of annual precipitation, stabilizing vegetative ground cover would occur in 2 years. Brush invasion to create a vegetative landscape similar to adjacent lands would occur within 13 to 15 years.

Adequate forage is available for current wildlife objective numbers.

Visual Resource

Visual resource management designations would be incorporated into all project planning. Designations would be managed with mitigation or by avoidance when affected by projects or activity impacts. Visual resources would continue to be given special consideration in the South Pass area where historical values are present.

Wild Horses

There would be a 20 percent annual increase in horse numbers and gathering would occur about every 2 years.

About 30 acres would be disturbed and vegetation and forage removed from developing wild horse traps.

Wildlife

Over the past 20 years, 2 spring developments, 8 water wells, 12 guzzlers, 30 exclosures, 29 potholes, 26 nesting structures, 11 gully plugs, 3 gabion weirs, 33 log overpours, 5 fish hatching facilities, and 7 revegetation plantings have been completed within the planning area. Through 2010, it is assumed that the same number of developments of each type would be completed.

The spring developments, water wells, and guzzlers would be protected by fence. Average exclosure size is: 1 acre for spring developments, 0.50 acres for water wells, and 0.75 acres for guzzlers. The average size of 10 special management exclosures would be 233 acres, while the average size of 20 riparian management exclosures would be 23.5 acres. The average pothole measures 35 feet by 35 feet and would disturb about 0.03 acre. Gabion weirs are 66.3 feet in length and would impound 0.20 acres of water. The average area of each revegetation planting (trees) would be 24.7 acres.

About 1,600 raptor nests have been located and are listed as "active." Within the next 10 years, an additional 120 nests may be located.

About 114 sage grouse strutting grounds have been identified over the past 20 years. An additional 40 strutting grounds may be identified within the next 10 years.

PREFERRED ALTERNATIVE

Assumptions

In addition to the Assumptions and Assessment Guidelines for all alternatives, the following assumptions for lands and realty, livestock grazing, minerals, off-road vehicles, socioeconomics, and wild horses specifically apply to the Preferred Alternative.

Lands and Realty

About 13,043 acres would be identified as possibly suitable for disposal through sale or exchange actions. About 20,782 acres are proposed for land acquisition which includes 640 acres for ACECs, 1,090 acres for cultural, 840 acres for riparian, 4,480 for state inholdings in WSAs, 3,040 acres for wild and scenic rivers, 5,452 acres for wildlife, 5,940 acres for threatened and endangered species, and 300 acres for public access. Approximate acreage of additional withdrawals would be 161,358 acres.

Land Use Authorizations

Over the next 20 years, an average of 300 permits, 4 leases, and 1,915 right-of-way grants would be issued.

Table 4-14 shows the number and acres of authorizations over a 20-year period. Not all authorizations result in surface disturbance.

Estimated total acreage disturbed over a 20-year period would be 9,158 acres plus 1,380 acres for mine start up (this does not include the 11,140 acres of road associated with oil, gas, and coalbed methane production shown under Oil and Gas and Coalbed Methane Assumptions).

Estimated total acreage reclaimed over a 20-year period would be 7,000 acres (this does not include the 1,100 acres of oil and gas roads relinquished and reclaimed shown under Oil and Gas Assumptions).

No lands would be provided for desert land entries or agricultural leases which have salinity/soil constraints.

Withdrawal Revocation

Table 2-7 presents the withdrawals that would be revoked or retained for each alternative.

TABLE 4-14

PROJECTED LAND USE AUTHORIZATIONS AND ACREAGE (by alternative)

Type of Surface Disturbance	Preferred Alternative		Alternative A		Alternative B		Alternative C	
	Number of Authorizations	Acres	Number of Authorizations	Acres	Number of Authorizations	Acres	Number of Authorizations	Acres
Permits	60	120	60	120	100	200	40	80
Oil and Gas	140	250	140	250	200	400	60	120
Total	**200**	**370**	**200**	**370**	**300**	**600**	**100**	**200**
Leases	2	20	2	20	4	40	1	10
Communication Sites	3	3	3	3	5	5	2	2
Telephone	180	720	180	720	200	800	150	600
Coal	10	1,200			10	1,200		
Total	**190**	**1,920**	**180**	**720**	**210**	**2,000**	**150**	**600**
Water Facilities	80	240	80	240	100	300	60	180
Coal	20	200			20	200		
Total	**100**	**440**	**80**	**240**	**120**	**500**	**60**	**180**
Other	100	800	100	800	120	960	80	640
Roads	7	280	7	280	10	400	5	200
Oil and Gas[1]	320	9,500	320	9,500	400	12,000	250	7,500
Coal	4	1,090			4	1,090		
Total	**331**	**10,870**	**327**	**9,780**	**414**	**13,490**	**255**	**7,700**
Pipelines	7	56	7	56	10	80	5	45
Oil and Gas[1]	720	5,760	720	5,760	800	6,400	680	5,440
Total	**727**	**5,816**	**727**	**5,816**	**810**	**6,480**	**685**	**5,485**
Totals of Surface Disturbance	**1,653**	**20,293**	**1,619**	**17,749**	**1,983**	**24,075**	**1,333**	**14,817**

[1] These are ROWs issued and do not include roads/pipelines authorized through the APD process. The acreage for roads associated with oil and gas wells also is shown under the Oil and Gas Assumptions. Approximately 20 ROWs (1,000 acres) are granted for non-oil and gas related access.

Livestock Grazing

Adequate forage would be available for current wildlife objective numbers. About 26,700 acres would be treated by prescribed fire to improve forage.

Minerals

Coal Operations

It is reasonable to expect that mining operations would continue on those lands urrently held under lease and on lands where lease applications have been submitted and may be approved for leasing over the next 20 years. Current mining operations are Black Butte/Pit 22, Bridger, Lion Coal, and Pilot Butte coal mines. It is assumed that two areas would have new surface mining operations within the next 5 to 15 years. The Deadman Wash tract and the Beans Spring area would have coal mining activity to support local and interstate markets. Map 74 shows the areas in which this surface disturbance is most likely to occur. Table 4-15 shows the estimated amount of yearly coal production and total production from mining these areas. About 430.9 million tons, life of mine, recoverable coal would be available. The average yearly amount of disturbance would be about 670 acres with an average production of about 16 million tons of coal.

TABLE 4-15

ESTIMATED YEARLY COAL PRODUCTION BY TRACT AREA
(million tons)
PREFERRED ALTERNATIVE AND ALTERNATIVE A

Year	Beans Spring	Black Butte/ Pit 22	Bridger	Cooper Ridge	Deadman Wash	Lion Coal	Pilot Butte	Total Production
1990[1]	0	5.8	5.8	0	0	0.11	0.19	11.9
1991	0	5.8	6.0	0	0	0.11	0.2	12.11
1992	0	5.8	6.0	0	0	0.10	0.5	12.4
1993	0	5.6	6.0	0	0	0.06	0.7	12.36
1994	0	5.8	5.9	0	0	0.05	3.9	15.65
1995	0	6.0	5.8	0	0.5	0.05	3.9	16.25
1996	0	6.0	5.9	0	0.8	0.05	4.0	16.75
1997	0	6.0	5.9	0	1.7	0.04	4.0	17.64
1998	0	5.8	6.0	0	2.0	0.03	4.2	18.03
1999	0	5.8	6.0	0	2.0	0.03	4.0	17.83
2000	0	5.7	6.0	0	2.0	0.02	3.9	17.62
2001	0	5.8	6.0	0	2.5	0.01	3.9	18.21
2002	0	6.0	5.8	0	2.5	0	3.9	18.20
2003	0	6.0	5.8	0	2.0	0	4.0	17.8
2004	0	5.9	5.8	0	2.0	0	4.0	17.7
2005	0.8	5.8	5.6	0	2.0	0	4.2	18.4
2006	1.0	5.8	5.5	0.6	1.0	0	4.0	17.3
2007	1.0	5.7	5.5	0.9	0	0	4.0	16.2
2008	1.0	5.6	5.3	1.7	0	0	4.2	16.1
2009	1.5	5.6	5.1	2.5	0	0	3.3	15.5
2010	1.5	5.5	5.1	3.0	0	0	0.7	12.8

[1] Actual production, base year

Oil and Gas and Coalbed Methane

Tables showing projected drilling activity and associated surface disturbance were prepared for the planning area (Table 4-16, each of the three Special Study Areas (Table 4-17; Table 4-18; and Table 4-19), and for coalbed methane (Table 4-20). In addition, projected production rates of oil and gas through 2010 are shown on Table 4-11).

TABLE 4-16

PROJECTED DRILLING ACTIVITY (1990 - 2010) AND ASSOCIATED SURFACE DISTURBANCE
GREEN RIVER RESOURCE AREA
PREFERRED ALTERNATIVE

A. Most Probable Future Projection[1]	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
1. Wells Drilled	70	138	207	273	339	404	469	532	594	656	717	778	838	897	956	1014	1072	1129	1185	1241	1300
2. Expected Producers[2]	44	87	130	172	214	254	295	335	374	413	452	490	528	565	602	639	675	711	747	782	819
3. Expected D&A	26	51	77	101	126	150	174	197	220	243	265	288	310	332	354	375	397	418	438	459	481
4. Abandoned Producers[3]	12	28	49	89	109	157	186	241	303	362	440	486	547	623	660	682	697	738	780	818	9616
5. Total Producers (1,712 as of 12/89)	1744	1771	1793	1795	1817	1811	1823	1808	1785	1765	1725	1718	1694	1656	1656	1670	1692	1687	1680	1677	1571
6. Acres of Surface Disturbance	10435	11203	11979	12726	13473	14200	14934	15646	16345	17044	17736	18421	19099	19764	20428	21085	21736	22380	23016	23646	24310
7. Acres Stabilized[4]	488	1069	1456	2085	2718	3384	4122	4758	5526	6199	6987	7801	8600	9486	10212	11005	11864	12529	13111	13657	14325
8. Net Long-Term Disturbance[5]	9947	10134	10523	10641	10755	10816	10812	10888	10819	10845	10749	10620	10499	10278	10216	10080	9872	9851	9905	9989	9985

[1] Cumulative Totals

[2] Success Ratio = 0.63

[3] Gas Well Productive Life = 20 Years; Oil Well Productive Life = 50 Years

[4] Assume 3-Year Stabilization

[5] Row 8 = Row 6 - Row 7

[6] The total number of gas wells drilled in 1990 not available

TABLE 4-17

PROJECTED DRILLING ACTIVITY (1990 - 2010) AND ASSOCIATED SURFACE DISTURBANCE LITTLE COLORADO DESERT (All Alternatives)

A. Most Probable Future Projection[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Preferred Alternative Alternatives A and C																					
1. Wells Drilled	12	24	36	49	61	73	85	97	109	122	134	146	158	170	182	194	207	219	231	243	255
2. Expected Producers[2]	8	15	23	31	38	46	54	61	69	77	84	92	100	107	115	122	130	138	146	153	161
3. Expected D&A	4	9	13	18	23	27	31	36	40	45	50	54	58	63	67	72	77	81	85	90	94
4. Abandoned Producers[3]	7	14	21	28	38	53	60	83	96	110	140	155	193	250	266	279	286	305	328	347	371
5. Total Producers (349 as of 12/89)	350	350	351	352	349	342	343	327	322	316	293	286	256	206	198	192	193	182	167	155	139
6. Acres of Surface Disturbance	2439	2571	2709	2855	2987	3125	3263	3395	3533	3678	3810	3948	4086	4218	4356	4488	4634	4772	4910	5042	5180
7. Acres Stabilized[4]	169	380	588	721	853	986	1127	1274	1447	1580	1792	1955	2130	2377	2550	2838	3220	3398	3560	3701	3894
8. Net Long-Term Disturbance[5]	2270	2191	2121	2134	2134	2139	2136	2121	2086	2098	2018	1993	1956	1841	1806	1650	1414	1374	1350	1341	1286
B. Maximum Future Projection[1]																					
Alternative B																					
1. Wells Drilled	26	52	79	105	132	158	185	211	238	264	289	314	339	363	387	409	431	453	473	492	510
2. Expected Producers[2]	16	33	50	66	83	100	117	133	150	166	182	198	214	229	244	258	272	285	298	310	321
3. Expecte d D&A	10	19	29	39	49	58	68	78	88	98	107	116	125	134	143	151	159	168	175	182	189
4. Abandoned Producers[3]	7	14	21	28	38	53	60	83	96	110	140	155	193	250	266	279	286	305	328	347	371
5. Total Producers (349 as of 12/89)	358	368	378	387	394	396	406	399	403	405	391	392	370	328	327	328	335	329	319	312	299
6. Acres of Surface Disturbance	2592	2889	3194	3485	3789	4086	4391	4682	4986	5277	5561	5844	6128	6398	6668	6917	7166	7409	7651	7865	8066
7. Acres Stabilized[4]	169	380	588	834	1081	1336	1582	1851	2138	2393	2719	3003	3284	3638	3916	4310	4790	5065	5309	5523	5796
8. Net Long-Term Disturbance[5]	2423	2509	2606	2651	2708	2750	2809	2831	2848	2884	2842	2841	2844	2760	2752	2607	2376	2344	2342	2342	2270

[1] Cumulative Totals

[2] Success Ratio = 0.63

[3] Gas Well Productive Life = 20 Years; Oil Well Productive Life = 50 Years

[4] Assume 3-Year Stabilization

[5] Row 8 = Row 6 - Row 7

TABLE 4-18

PROJECTED DRILLING ACTIVITY (1990 - 2010) AND ASSOCIATED SURFACE DISTURBANCE GREATER NITCHIE GULCH (PREFERRED ALTERNATIVE AND ALTERNATIVE C)

A. Most Probable Future Projection[1]	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
1. Wells Drilled	3	5	8	9	11	13	15	16	18	19	21	22	23	25	26	28	30	31	33	35	36
2. Expected Producers[2]	2	3	5	6	7	8	9	10	11	12	13	14	14	16	16	18	19	20	21	22	23
3. Expected D&A	1	2	3	3	4	5	6	6	7	7	8	8	9	9	10	10	11	11	12	13	13
4. Abandoned Producers[3]	2	8	15	17	19	20	21	23	24	25	27	28	30	33	34	36	38	48	58	72	76
5. Total Producers (72 as of 12/89)	72	67	62	61	60	60	60	59	59	59	58	58	56	55	54	54	53	44	35	22	19
6. Acres of Surface Disturbance	694	715	749	763	784	805	826	839	860	874	895	908	916	943	950	977	998	1012	1033	1054	1067
7. Acres Stabilized[4]	85	193	319	354	400	459	478	504	525	546	564	588	599	625	638	656	688	700	727	753	812
8. Net Long-Term Disturbance[5]	609	522	430	409	384	346	348	335	335	328	331	320	317	318	312	321	310	312	306	301	255

[1] Cumulative Totals

[2] Success Ratio = 0.63

[3] Gas Well Productive Life = 20 Years; Oil Well Productive Life = 50 Years

[4] Assume 3-Year Stabilization

[5] Row 8 = Row 6 - Row 7

TABLE 4-19

PROJECTED DRILLING ACTIVITY (1990 - 2010) AND ASSOCIATED SURFACE DISTURBANCE
WAMSUTTER ARCH
(All Alternatives)

A. Most Probable Future Projection[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Preferred Alternative																					
Alternative A																					
Alternative C																					
1. Wells Drilled	8	15	21	28	33	39	44	49	54	58	62	66	70	73	77	80	83	86	88	91	94
2. Expected Producers[2]	5	9	13	18	21	25	28	31	34	37	39	42	44	46	49	50	52	54	55	57	59
3. Expected D&A	3	6	8	10	12	14	16	18	20	21	23	24	26	27	28	30	31	32	33	34	35
4. Abandoned Producers[3]	15	30	45	50	53	58	62	69	79	84	86	89	94	95	95	95	95	97	102	114	218
5. Total Producers (375 as of 12/89)	365	354	343	343	343	342	341	337	340	328	328	328	325	326	329	330	332	332	328	318	216
6. Acres of Surface Disturbance	2087	2164	2341	2450	2533	2629	2711	2794	2876	2938	3007	3068	3137	3186	3247	3302	3351	3398	3419	3454	3488
7. Acres Stabilized[4]	58	149	162	302	434	558	640	696	770	830	906	996	1054	1096	1144	1201	1231	1264	1287	1312	1346
8. Net Long-Term Disturbance[5]	2029	2015	2179	2148	2099	2071	2071	2098	2106	2108	2101	2072	2083	2090	2103	2101	2120	2134	2132	2142	2142
B. Maximum Future Projection[1]																					
Alternative B																					
1. Wells Drilled	4	9	13	19	24	31	38	46	54	64	75	86	99	113	129	145	164	183	205	228	253
2. Expected Producers[2]	3	6	8	12	15	20	24	29	34	40	47	54	62	71	81	91	103	115	129	144	159
3. Expected D&A	1	3	5	7	9	11	14	17	20	24	28	32	37	42	48	54	61	68	76	84	94
4. Abandoned Producers[3]	15	30	45	50	53	58	62	69	79	84	86	89	94	95	95	95	95	97	102	114	218
5. Total Producers (375 as of 12/89)	363	351	338	337	337	337	337	335	330	331	336	340	343	351	361	371	383	393	402	405	316
6. Acres of Surface Disturbance	2045	2101	2143	2212	2267	2350	2426	2516	2606	2717	2842	2966	3112	3271	3451	3631	3845	4060	4309	4572	4849
7. Acres Stabilized[4]	58	149	162	302	434	558	640	696	770	830	906	996	1054	1096	1144	1201	1231	1264	1287	1312	1346
8. Net Long-Term Disturbance[5]	1987	1952	1981	1910	1833	1792	1786	1820	1836	1887	1936	1970	2058	2175	2307	2430	2614	2796	3022	3260	3503

[1] Cumulative Totals

[2] Success Ratio = 0.63

[3] Gas Well Productive Life = 20 Years; Oil Well Productive Life = 50 Years

[4] Assume 3-Year Stabilization

[5] Row 8 = Row 6 - Row 7

TABLE 4-20

COALBED METHANE PROJECTED DRILLING ACTIVITY (1990 - 2000) AND ASSOCIATED SURFACE DISTURBANCE GREEN RIVER RESOURCE AREA (PREFERRED ALTERNATIVE AND ALTERNATIVE C)

Most Probable Future Projection[1]	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Wells Drilled	11	11	45	95	145	195	230	235	240	245	250
Expected Producers[2]	9	9	36	76	116	156	184	188	192	196	200
Expected D&A	2	2	9	19	29	39	46	47	48	49	50
First Production[3]	0	0	9	9	36	76	116	156	184	188	192
Acres of Surface Disturbance	140	140	567	1,197	1,827	2,457	2,898	2,961	3,024	3,087	3,150
Acres Stabilized[4]				90	90	369	779	1,189	1,599	1,886	1,927
Net Long-Term Disturbance[5]	140	140	567	1,107	1,737	2,088	2,119	1,772	1,425	1,201	1,223

[1] Cumulative Totals

[2] Success Ratio = 0.80

[3] 2 Years Between Completion and First Production

[4] Assume 3-Year Stabilization

[5] Row 7 = Row 5 - Row 6

Mining Law

An oil shale withdrawal covers a large portion of the Green River and Washakie Basins within the planning area, prohibiting the location of mining claims. At some point, the oil shale withdrawal would be revoked. New mining claims would begin to be located in this large area after revocation, especially for zeolite in the Washakie Basin.

It is assumed that demand for naturally occurring zeolite would increase, just as demand for naturally occurring sodium carbonate (trona) increased a few decades ago. At least 1 mining operation for zeolite deposits would be initiated. Such zeolite development would likely use the equipment and methods of a bentonite mine or a gravel pit, such as scrapers, dozers, belly dump trucks, etc. A large zeolite mining operation would employ approximately 8 to 10 people. A proposal issued by a minerals company for a zeolite mine projected an operation mining 9 to 10 months of the year, at an annual rate of up to 100,000 tons. Table 4-21 projects the amount of surface disturbance associated with a hypothetical zeolite mine.

TABLE 4-21

HYPOTHETICAL ZEOLITE MINE
(100,000 tons/year potential)
(4-inch seam multiple seam potential)

Year	Production (000)	Disturbance	Reclaimed	Total Disturbance	Total Reclaimed	Total Remaining Disturbance
2000	—	20	—	20	—	20
2001	25,000	30	—	50	—	50
2002	50,000	20	10	70	10	60
2003	75,000	15	5	85	15	70
2004	100,000	20	10	105	25	80
2005	100,000	10	10	115	35	80
2006	100,000	15	10	130	45	85
2007	100,000	5	5	135	70	65
2008	100,000	20	15	155	85	70
2009	100,000	30	40	185	125	60
2010	100,000	20	40	205	165	40
2011	—	—	40	205	205	0

Off-Road Vehicles

1990 data show that 342,550 visitor hours (28,546 visitor days) were spent in the planning area. It is anticipated that visitor use days would increase by approximately 60 percent over 20 years due to the natural increase in people anticipated from mineral development as expressed in the historical trends of recreation increase as reflected in the annual Recreation Management Information System (RMIS) Report.

Socioeconomics

The current level of livestock active preference (historically established) AUMs (318,647 AUMs) and actually utilized AUMs each year would remain unchanged over the next 20 years. In effect, total active preference for livestock use would be 318,647 AUMs/year on publicly managed land with actual use on this land ranging between 180,000 and 200,000 AUMs. The BLM manages about 95 percent (302,715 AUMs) of the public AUMs. The balance (15,932 AUMs) are managed by BOR and USFS. It is also assumed that active preference AUMs are in proper condition for grazing and that there are no unforeseen costs or adverse impacts resulting from this level of AUM use to reduce the total output value.

Changes in annual coal output over the 20 years are due in part to the opening and closing of various mines during that time frame. In 1990, there are a total of 4 active mines, while in the peak year 2005, five active mines are projected. Beans Spring mine would be on line and beginning operations and the Lion mine is expected to be nearing closure of operations by 2005. By the year 2010, there would once again be only 4 active mines with both Lion and Deadman Wash mines projected to have ceased operations.

Wild Horses

Fifteen water developments would be proposed in the Rock Springs Allotment primarily to enhance wild horse habitat (Appendix 9-4). Only controlled waters (i.e., wells) would be developed.

Impact Analysis

Air Quality

There are no air quality regulations which the Bureau of Land Management is directly responsible for enforcing. The State of Wyoming Department of Environmental Quality is the agency with which the BLM must coordinate in air resource management. The Wyoming DEQ was delegated enforcement authority within the state by the federal Environmental Protection Agency. However, the National Environmental Policy Act and the Federal Land Policy and Management Act state that Federal land management agencies must not either directly or indirectly contribute to exceedances of pollution control regulations. The BLM engages in a number of activities which ultimately have an impact on air quality. In the development of NEPA documents by the BLM and when new regulations are proposed by the state or EPA, the BLM coordinates on comments and adjustments regarding BLM managed activities. In developing a management plan for other resources over which the agency has direct control, it is important that concern is maintained for resources such as air quality for which the BLM is not the primary control agency. Table 4-22 lists a number of the activities managed by the Bureau which have an influence on air quality. As an aid in comparing the magnitude of the air quality impact of each of these activities, typical emission factors are also listed. Another component of the magnitude of the impact of various activities on air quality is how widespread or large the activity is.

TABLE 4-22

BLM-MANAGED ACTIVITIES WHICH AFFECT AIR QUALITY AND TYPICAL EMISSION FACTORS FOR EACH

Activity	Pollutant	Emission Factor	
Coal Leasing	PM-10	30-100	lb/yr/acre disturbed
(probably 1/3 TSP)		1-3	lb//VMT
		1.5-15	lb/blast
		.001-.01	lb/ton coal mined
	TSP	100-300	lb/yr/acre disturbed
		2-10	lb/VMT
		5-50	lb/blast
		.002-.03	lb/ton coal mined
Oil & Gas Leasing	Nitrogen Oxide	0.0	lb/yr/drill
	Sulfur Dioxide	0-1.5	ton/yr/flare
	PM-10	0.0	lb/yr/drill or pump
	Hydrogen Sulfide	0-.15	lb/yr/well
Gas Sweetening Plants	Sulfur Dioxide	0-150	ton/yr
	Hydrogen Sulfide	0.15	ton/yr
Trona Leasing	PM-10	30-100	lb/yr/acre stockpile
			tons/yr/plant
	TSP	100-300	lb/yr/acre stockpile
		700-1500	tons/yr/plant
Prescribed Burning	PM-10	8-32	lb/Ton burned
	TSP	10-40	lb/Ton burned

A site-specific analysis would be used where the siting of an activity with the potential to emit a large amount of air pollutants was the result of a BLM activity.

As can be seen from the final climatological pollution potential map (Map 79), the entire planning area has a median pollution risk. However, some small areas are near the borderline of the high risk category. The BLM would require further site specific analyses before permitting any activities in those areas. For instance, there is a point near the town of Green River where the pollution potential reaches 144, nearing the high potential category.

Summary

Adverse impacts to users could occur because of restricted location for placement of facilities.

Surface mining, construction activity, road use, facility emissions, prescribed fire, and wildfire affect air quality. Individual fires and construction activities would have a short-term affect. Industrial emissions, dust from continued road use, and surface mining, and vehicle emissions would be anticipated to occur over the long term. The level of construction activity would be reduced and impacts would be less than Alternative A. However, additional acres burned through prescribed fire would increase short-term impacts from smoke generated. No irreversible irretrievable impacts would be expected.

Candidate Plant Species

Factors that adversely affect air quality (e.g., emissions from industrial sites, airborne particulate, etc.) may also affect candidate plant species, especially if source areas are located near, upwind, or adjacent to actual plant locations or potential habitat areas.

Generally, stipulations and management actions associated with cultural and paleontological resource management would benefit and protect candidate plant locations and potential habitat areas. Limitations imposed within the visual horizon of designated and nondesignated historic roads and trails would benefit and protect candidate plant locations and potential habitat areas. Management actions imposed to protect sensitive cultural values would benefit and protect precocious milkvetch locations and potential habitat.

While most candidate plant locations and potential habitat areas are generally not dependent on fire, ecosystems have a low priority for prescribed burns. Actions implemented to confine, control, and/or contain fires and prescribed burns (fire line construction, driving, and backfires) could damage or remove actual plants and severely impact potential habitat. In addition, fire itself could remove plants or alter potential habitat. Under this alternative, wildfire suppression activities would be limited to existing roads and trails in actual candidate plant locations and potential habitat areas; therefore, impacts would be insignificant due to total area impacted.

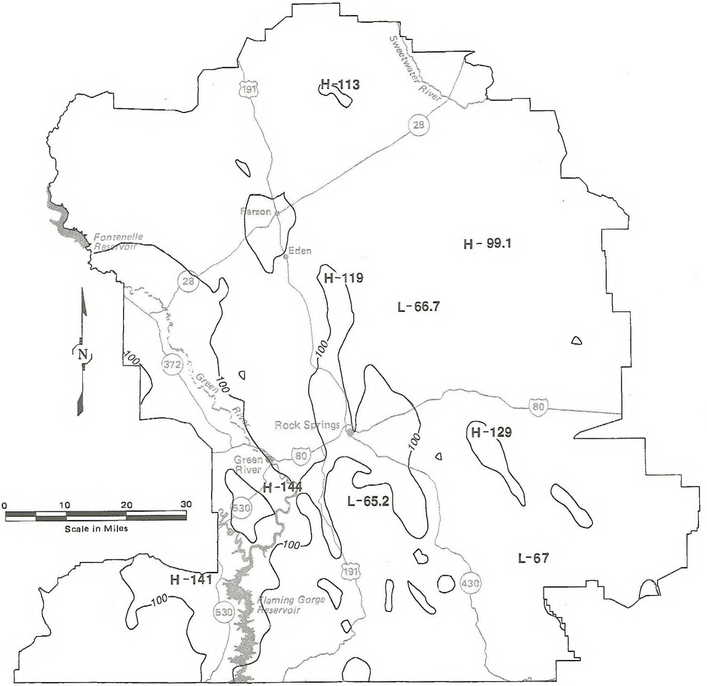
Management activities implemented on commercial, noncommercial, and woodland forests would have no impact to candidate plants or potential habitat areas.

Possible closure and reclamation of two illegal dumps near McKinnon could remove or otherwise damage existing populations and potential habitat areas of precocious milkvetch. Illegal expansion of these dumps may also remove plants and thus adversely affect the population.

Identified land disposal would have no impact to candidate plant populations or potential habitat areas. Acquisition of 1,900 acres of non-federal land that supports *Descurainia torulosa* would have beneficial impacts to existing populations and potential habitat areas. Pursuit of withdrawals in actual candidate plant locations would prevent impact to candidate plants from mining activity. Management of actual candidate plant locations as right-of-way avoidance areas and potential habitat areas as candidate plant survey areas would ensure no damage to candidate plant populations due to issuance of rights-of-way and permits.

Management prescriptions, including no surface occupancy stipulations in actual plant locations, would prevent impact to candidate plants due to range improvement projects such as wells, reservoirs, and fences. Salting stations or other apparatus that concentrate livestock activity could damage or remove any of the candidate plant species. With present livestock numbers, there seems to be little, if any, impact to candidate plant locations or potential habitat from livestock grazing. Meadow pussytoes (*Antennaria arcuata*) actually seems to thrive in grazed meadows, although the association between population densities and livestock grazing is not fully understood. If livestock numbers were increased to the full authorized level, animals would be forced to use areas not presently grazed and candidate plants could be impacted.

Conversions from cattle to sheep could alter grazing patterns and forage preference. Candidate plant locations and potential habitat could be impacted by such management action.



Map 79
Climatological Pollution Potential
Green River Planning Area

Chemical control of noxious weeds could impact candidate plant populations. Control of thistle in the wet meadows around and near South Pass could remove or severely alter existing populations of meadow pussytoes.

Candidate plant species locations would be closed to mineral material sales, oil and gas leasing, and geophysical vehicles. This action would prevent damage to plant populations already inventoried. Plant and habitat searches would be conducted and avoidance would be designated prior to geophysical activity or other surface disturbance; therefore, there would be no impact to candidate plants in areas that have not been inventoried.

Actual plant locations would be closed to off-road vehicles, and off-road vehicle use in potential habitat areas would be limited to existing roads and trails; therefore, in theory, there would be no impact to candidate plant populations. But, unauthorized off-road vehicle use does occur and could impact current populations and otential habitat. Increased recreational use in the Pine Creek exclosure could impact small rockcress (*Arabis pusilla*). Increased recreational activity on Quaking Aspen Mountain is considered a threat to *Descurainia torulosa*. Expansion of the telecommunication facility on Quaking Aspen Mountain may also adversely affect this species.

Trampling by wild horses has been listed as a threat to existing populations of large fruited bladderpod (*Lesquerella macrocarpa*); however, potential impacts appear to be minimal.

Management actions described to protect visual quality, watershed values, wilderness areas, wild and scenic rivers, wildlife habitat, and special management areas would generally benefit or not impact candidate plant populations or potential habitat.

Summary

Activities such as wildfire suppression activities, salting or areas where livestock concentrate, chemical control of noxious weeds, geophysical activity in potential habitat areas, off-road vehicle use, increased recreation use, trampling by wild horses, closure or expansion of the McKinnon dump, and conversions of sheep to cattle could contribute to an irreversible irretrievable loss of the plant populations. However, restrictions on wildfire suppression, geophysical activity, and off-road vehicle use would reduce the level of impact from Alternative A. Activity on existing mining claims and unauthorized uses could result in an irretrievable loss of plant populations and habitat. Withdrawing the 3,110 acres with known candidate plant populations or habitat from new mining claims and mineral material sales would reduce the level of impact.

Cultural, Natural History, and Paleontological

The impacts listed for cultural, natural history, and paleontological resources would not generally be significant once steps outlined in Assumptions and Analysis Guidelines are followed. Disturbance with no mitigation would occur for some non-NRHP sites and very rarely on NRHP eligible sites.

Site specific cultural resource management plans on 15 trails (800 miles) and 12 sites would benefit cultural resources by targeting management and available budget.

Management of cultural resources in Little Colorado Desert, North Nitchie Gulch, and Wamsutter Arch with an alternative strategy, to standard Class III inventory, could result in destruction of an estimated 14 sites. It is anticipated that by conducting Section 106 consultation within a NRHP District concept, adverse effects to these sites would be mitigated by data recovery elsewhere within the NRHP District.

Management of geologic and ecologic values of Steamboat Mountain and Boar's Tusk-Killpecker Sand Dunes would help preserve their values as sites of spiritual significance identified by Native American groups.

Construction of linear rights-of-way could destroy approximately 30 sites.

Land disposal could allow approximately 50 sites to pass into ownership where management to NHPA standards is not required. Fort LaClede would be acquired and protected.

Retention of 992 acres of cultural withdrawals and the addition of 6,735 acres of withdrawals would protect specific cultural values.

Construction of well locations, pipelines, and access roads could destroy approximately 70 sites and destroy the integrity of an undetermined number of miles of historic trails.

Surface disturbance associated with coalbed methane development could impact approximately 15 historic properties.

Strip mining and construction of surface support facilities could result in impacts to approximately 110 historic sites.

Although only 61 acres of surface disturbance is projected in playa lake areas, the areas where development is proposed includes a playa lake-sand dune complex of known high site density. It is estimated that 12 significant sites could be destroyed.

Opening new coal mining operations in Deadman Wash and Beans Spring would impact cultural resources. Site density is likely to be twice the average density, or 7 to 8 sites per section in the Deadman Wash area. Beans Spring has been less than the average.

A hypothetical zeolite mine has minimal potential to impact cultural resources. It is estimated that one significant historical property could be impacted.

Closure or limitation of off-road vehicle use to designated roads and trails n approximately 478,000 acres would lessen potential impacts to historic properties by lowering the potential for vehicular damage and unauthorized activities such as vandalism and looting. Closing 34,902 acres to geophysical vehicles and explosive charges would protect significant cultural sites and areas from destruction and associated erosion.

Managing approximately 2,500 acres of Class II VRM would result in protection for significant rock art sites.

Occasionally, watershed and cultural resources may both be at risk in the development of facilities such as oil and gas wells, pipelines, or access roads. At times, it may be impossible to avoid a significant cultural resource without placing a facility in a location that would be detrimental to watershed. This impact could be significant; however, it is anticipated such situations would occur rarely, and fewer than 10 sites would be affected over the next 20 years.

Generally only beneficial effects would result from wild and scenic rivers management. Protective measures for wild and scenic rivers would usually also favor cultural resources. Preservation of wild and scenic qualities of specific rivers would add aesthetically to efforts to preserve our heritage as reflected in prehistoric and historic occupation related to the river.

Summary

Potential impacts to approximately 190 cultural resources would result form surface disturbing activities. Destruction of sites could result from scientific research and from data recovery mitigation efforts. While data recovery enhances our knowledge, it also destroys the resource. Targeted management efforts within cultural resource management plans would benefit and enhance cultural resources. If sites are not avoided, an irretrievable loss of the resource would occur.

Other actions providing long-term benefits to cultural management would be: acquisition of Fort LaClede, 7,727 acres of withdrawals, management of the Steamboat Mountain and Boar's Tusk-Killpecker Sand Dunes areas for geologic and ecologic values, management of 2,500 acres as Class II VRM around significant rock art sites, closure or limitation of areas for off-road vehicle use, and closure of 34,902 acres to geophysical vehicles and explosive charges.

Information gained from research on archeological resources would provide valuable insight into past climates and human use of resources which could improve management of public lands.

Fire

Impacts would be similar to those described under Alternative A. Increased activity that would result in the use or assembling of people on wildlands would increase the probability that a wildfire would occur. Without protection for either prescribed burns or wildfires, potential would exist to remove the grass/forb component of the system and increase the brush and annual grass occurrence.

Increased activity may develop greater exposure to incidental hazardous waste during suppression activities.

Summary

Short- and long-term impacts could occur from additional costs for wildfire suppression and prescribed fire, accrued from restrictions imposed by other resource management requirements. The additional restrictions under this alternative would increase costs over Alternative A.

Forestry

Implementation of this alternative would result in all commercial forest lands in the planning area being placed in an intensive management category. It would also result in the annual sales quantity being reduced from a potential harvest level of 1,100,000 board feet (maximum volume output projection by the 1985 computations for the Rock Springs District) to 500,000 board feet. This would equate to a 55 percent reduction. In addition to the reduced volume output, this alternative also places operational and seasonal restrictions on forest management activities.

Operational Restrictions

No timber management activities or firewood cutting would be allowed within ¼ mile of potential wild and scenic river segments on the Sweetwater River. An estimated 400 acres of commercial forest land would be affected by the restriction; however, actual figures have not been computed.

No surface disturbance would be allowed on roughly 150 acres of commercial forest land that occurs within 500 feet of live water, floodplains, and/or riparian/wetland areas (excludes acres that fall within wild and scenic river restrictions).

Clearcuts would be limited to a maximum size of 25 acres.

Seasonal Restrictions

Logging and fuelwood gathering are not allowed on 1,436 acres from November 15 through April 30 for big game winter range protection, on 2,662 acres from May 1 through June 30 for protection of elk calving activities, and on 22 acres from February 1 through July 31 for protection of sage grouse and raptor nesting activity and habitat.

Summary

The reduced quantity of timber volume available for harvesting combined with the operational/seasonal restrictions on 4,670 acres would decrease the amount of raw material available to lumber producers, would increase the costs of getting the material to a production center, would decrease the timber sale receipts/revenue to the government, and would result in less forest management and forest stand maintenance in the commercial forest stands which would ultimately lead to increased losses to insects and/or disease. Impacts to the forest management program, forest resources, and the forest-based economics would be moderate to high when compared to Alternatives A and B, and roughly the same when compared to Alternative C.

Hazardous Materials

Hazardous waste spills and unauthorized dumping on the public lands would be immediately cleaned up by BLM or the responsible party to reduce resource impacts. Lands would be inspected prior to transfer out of public ownership or prior to acquisition to protect the public from contact with hazardous materials.

Water resources would be protected by testing produced water pits or drilling fluid pits if they show indications of containing hazardous wastes.

Lands and Realty

Public land users would be impacted by 299,740 acres set aside for avoidance, exclusion, and no surface occupancy, and 1,668,440 acres with seasonal restrictions due to recreation, cultural, visual, wildlife, and other resource values. Approximately 25 percent of all rights-of-way would be impacted by these decisions (Table2-4; Table 2-5; and Table 2-9).

The majority of the exclusion areas are: 10- to 20-acre petroglyph sites and there would be no impact on rights-of-way; the exclusion of a ¼ mile corridor along the Sweetwater River wild and scenic river corridor would have minimum impact due to the lack of right-of-way activity in these areas; exclusion of rights-of-way in the Currant Creek drainage could have a significant impact on proposed Federal/County road construction along the Forest Service boundary if a new location on federal land for crossing Currant Creek is necessary. Rights-of-way in exclusion areas would not be allowed unless mandated by law.

Avoidance areas would have small impact on rights-of-way except for those large areas within the Greater Sand Dunes ACEC (38,650 acres), South Pass Historic Viewshed/Landmark (50,330 acres), proposed Steamboat Mountain ACEC (43,010 acres), and the entire proposed Tri-State Monument ACEC (126,080 acres). To avoid these areas would require major reroutes.

Following Questar Pipeline Company's construction of Mainline No. 58 pipeline loop, it is proposed to close the existing right-of-way concentration area in the proposed Tri-State Monument ACEC to additional rights-of-way. This would preclude future looping of the existing pipelines and construction of any new pipelines from the Clay Basin storage facility along the existing route. Realignment of the major highway and/or construction of an additional highway through the proposed Tri-State Monument ACEC is being contemplated, and these projects would be impacted by the avoidance/right-of-way exclusion decisions. Although there is not much activity in the South Pass Historic Landmark, Greater Sand Dunes ACEC, or proposed Steamboat Mountain ACEC, any proposal to place facilities in these general areas may require major reroutes and extensive planning to limit impact to the resource values.

A total of 3,110 acres of actual candidate plant sites would be exclusion areas for rights-of-way. These small sites would not have an impact on right-of-way location. Candidate plant sites would be withdrawn which would preclude disposal or entry. An inventory would be required on 38,650 acres of candidate plant habitat prior to construction, which would impact the timing of construction of rights-of-way as these inventories can occur only at certain times of the year.

Seasonal restrictions and other mitigation measures to protect resource values and threatened and endangered species (T&E) would impact rights-of-way. Approximately 30 rights-of-way may have to be rerouted or mitigated annually to protect cultural/historical, wildlife, and T&E values. Crucial wildlife habitat would impact the location or timing of rights-of-way construction. Wetland/riparian areas and floodplains also would impact the location of rights-of-way.

The possibility of high dust levels resulting from use of unpaved access roads would necessitate stipulations to control dust. All construction rights-of-way as well as access road rights-of-way would include a stipulation requiring that the holder meet Federal and State air quality standards.

Land tenure adjustments would occur only if the benefits outweigh any adverse impacts, and if there are no significant impacts which cannot be mitigated. A total of 13,043 acres have been identified as possibly suitable for disposal (Appendix 8-1). The ability to sell/exchange land and to issue Recreation and Public Purpose Leases and patents would benefit communities and industry. The sale or exchange of isolated tracts would result in the disposal of lands that are difficult to manage. Based upon past experience, it is anticipated that 3,000 acres would be sold, exchanged, or patented under the Recreation and Public Purposes Act over the next 20 years. Sale or exchange of lands may be necessary to accommodate the need for hazardous material or solid waste disposal sites. All lands must have a hazardous waste clearance prior to disposal which would increase the cost to the proponent or to the Bureau.

Existing withdrawals would be reviewed, and those which no longer serve the purpose for which they were withdrawn would be revoked. These lands (nearly 90 percent of the planning area) would be open for entry, disposal, and mineral location. By revoking the withdrawals, it is possible that there may be a rush to file mining claims (Table 2-7).

The withdrawal of 161,354 acres of lands within ACECs and other special management areas would preclude disposal, entry, and mineral location. Assuming the mineral and stock driveway withdrawals are revoked, and all proposed withdrawals are completed, a total of 162,384 acres would be impacted (Table 2-6).

As part of the federal program to reduce the salinity and sedimentation of the Green River Basin, desert land entries or agricultural leases would be authorized only if such use meets the soils/water and Department of Agriculture criteria. This would have slight impact as little of the planning area meets the criteria for desert entry.

The acquisition of access would be required to protect and promote resource values (ACECs, recreation, timber and mineral sales, access to BLM improvements, etc.) (Table 2-8).

Summary

The majority of rights-of-way require short-term use of lands; long-term productivity is restored upon rehabilitation. The addition of two new rights-of-way windows would concentrate activities and reduce disturbance. Unavoidable adverse impacts could occur to rights-of-way management because of constraints for resource protection that impact the routes selected and the timing of construction. The greatest impact would be in those areas which would be managed as no surface occupancy areas and are listed as avoidance or exclusion areas for rights-of-way.

Mineral withdrawals would be revoked and other lands withdrawn for resource protection (about 161,358 acres). The same beneficial and adverse impacts would occur as under Alternative C.

Lands would be irreversibly lost to the public land base when sold or exchanged, about 2,000 acres over the next 20 years (13,043 acres have been identified as possibly suitable for disposal). Under exchange, however, lands of comparable value would be obtained. Lands currently authorized as landfill sites or industrial ponds would be irretrievably committed to compatible uses. For example, landfill sites are susceptible to subsidence and methane gas leakage; therefore, any later surface construction must take these potential problems into account. Railroad rights-of-way or any rights-of-way requiring large amounts of earthwork may be irretrievable due to cost and complexity of rehabilitation.

Livestock Grazing

Management actions described in this alternative would generally benefit livestock grazing management. In the short term, a reduction of active preference may be necessary for individual permittees, causing potentially significant impacts; however, in the long term, rangeland condition would be improved, restoring active preference, and thus causing beneficial impact.

Management actions implemented to ensure that 75 percent of the riparian areas are in proper functioning condition could require that existing grazing systems be altered and riparian habitat objectives be established in some "I" category allotments. In some instances, it may be necessary to establish utilization levels in riparian areas to meet riparian habitat objectives. Permitted active preference could be reduced to minimize utilization of riparian vegetation by livestock in some allotments.

Exclusion of grazing from Palmer Draw and special management exclosures (approximately 1,900 acres) would have a minor impact (160 AUMs) to the available forage in the planning area.

Approximately 67,700 acres would be treated by prescribed fire to increase livestock, wild horse, and wildlife forage; improve wildlife habitat; and regenerate shrubs. This action would cause short-term loss of forage in allotments where burns occur; however, this impact would eventually be outweighed by improvement of forage condition, availability, and habitat improvement. Overstocking could occur in portions of an allotment if livestock numbers are not reduced to compensate for loss of burned acreage for 2 growing seasons.

Additional rangeland improvements would be constructed in order to implement 9 remaining AMPs and complete implementation of 10 existing AMPs. The needed improvements include 6 water wells, 20 miles of pipeline, 36 reservoirs, 27 miles of new fences, 2 spring developments, 43 miles of fence reconstruction, and 10 troughs (Appendix 9-4). Construction of the proposed improvements would reduce available AUMs for livestock by 6 AUMs.

Avoidance of significant cultural sites, limitations on activities within ¼ mile of historic trails, and subordination of activities to historic landscape values in some areas may constrain the BLM's ability to construct rangeland improvements aimed at achieving better distribution and management of livestock. Added survey and design costs may be necessary to avoid effects to cultural resources.

Surface disturbance would be expected in areas where fossil collection would be permitted. However, the loss of available forage from the only documented area of collection, the Farson fish beds, would be minimal (less than 5 AUMs).

Management actions for lands and reality due to sales, rights-of-ways, disposals, and exchanges would reduce available forage in the planning area. Approximately 13,043 acres would be taken out of production due to sales and other disposals. Approximately 1,086 AUMs would be reduced from active preference to support this action.

Long-term benefits would occur for completion and implementation of 42 AMPs on about 60 percent of the planning area.

Existing lands and realty, mineral, wild horse, range, and wildlife actions have removed roughly 3,346 AUMs of livestock forage from surface disturbing activities. Management actions proposed for the next 20 years would remove forage from an additional 55,523 acres. In total, forage production would be affected on 95,941 acres. During the next 20 years, an estimated 41,192 acres would be reclaimed. After reclamation, roughly 54,749 acres would still be out of forage production. The forage loss associated with the unreclaimed lands would be approximately 4,568 AUMs. Table 4-23 shows the expected losses by disturbance category.

Loss of forage would be expected from approximately 3,000 acres (233 AUMs) due to mineral sales, locatable mineral production, and trona mining.

Some off-road vehicle users would continue to harass livestock and leave gates open.

The no surface occupancy stipulation on 3,110 acres of candidate plant sites and inventory requirement for 35,540 acres of potential habitat should not have an impact to livestock grazing management but could limit the locations available for rangeland improvement construction or increase project survey and design costs. Grazing distribution patterns may not improve if rangeland improvement project construction is limited.

Increased design and construction costs for range improvements would be expected for conformance to VRM Class II standards. In some instances, project construction would not be permitted and grazing distribution patterns would not improve.

The ½ mile buffer of no surface occupancy within wild horse viewing locations could prevent construction of rangeland improvement projects and prevent improvement of livestock distribution patterns. Implementation of this action could result in not achieving AMP objectives.

TABLE 4-23

LIVESTOCK FORAGE/AUM LOSSES (PREFERRED ALTERNATIVE)

Activity	Existing Disturbed Acres	Projected Disturbed Acres	Total Disturbed Acres	Reclaim ed Acres	Net Disturbed Acres	AUMs Lost
Lands Actions						
Disposal	2,783	13,043	15,826	NA	15,826	1,319
Authorizations (R/Ws, permits, leases)	8,325[1]	10,538	18,863	7,000	11,863	989
Wild Horse						
Trap sites	62	30	92	0	92	8
Water development	0	15	15	0	15	1
Range Improvements						
Wells, pits, reservoirs	810	77	887	0	887	74
Wildlife						
Guzzlers	10	0	10	0	10	4
Exclosures	930	970	1,900	0	1,900	160
Mineral						
Oil and gas	10,435	13,875	24,310	14,325	9,985	832
Gravel pits	1,080[2]	—	1,080	—	1,080	90
Coalbed methane	140	3,010	3,150	1,927	1,223	102
Coal (6 mines)	13,918	13,640	27,558	17,940	9,618	802
Mine Sites (trona, jadeite, zeolite, gold)	1,920	325	2,245	0	2,245	187
Sodium wells	5	0	5	0	5	<1
Total	**40,418**	**55,523**	**95,941**	**41,192**	**54,749**	**4,568**

[1] Based on Resource Area estimates. Actual disturbance due to lands actions is not presently known (Haverly).

[2] Based on Resource Area estimates. Actual acreage of gravel pits is not known. It is assumed that the amount of disturbance will remain constant (i.e., new acres disturbed would be offset by acres reclaimed) (Porter).

In order to provide 17,400 AUMs of forage to wild horses in 5 wild horse areas, decreases in active grazing preference could be necessary in certain allotments. Adjustments, if necessary, would be determined after analysis of rangeland monitoring information and evaluation of AMPs and wild horse herd area management plans.

Current and proposed wildlife populations could impact livestock grazing management. Current and future AMPs would have objectives set to improve or maintain wildlife habitat condition. As AMPs are evaluated, adjustments to active grazing preference, grazing management, season of use, or kind of livestock may be necessary to ensure adequate wildlife habitat and forage availability. Rangeland and wildlife habitat monitoring would continue to determine if activity plan objectives are being reached. Overuse of vegetation (especially browse) could occur in areas where wildlife numbers are over strategic plan levels and active licensed grazing use is at or near preference.

Due to no surface occupancy stipulations, range improvements would not be constructed in the proposed Steamboat Mountain ACEC unless elk would benefit. Therefore, livestock grazing distribution patterns would not be improved over most of the Steamboat Mountain Allotment, half of the Pacific Creek Allotment, and significant portions of the Sands, Bush Rim, and Fourth of July Allotments. Active preference in these allotments would not be increased and additional available forage would be allocated to wildlife.

Increasing the strategic plan numbers of antelope in the Sublette antelope herd could have a major impact to livestock. Monitoring has not been completed or evaluated at this time to determine if there is available forage to support an increase. Any increase without supportive data could cause deterioration of the rangeland resources. Current populations of antelope (30,000) are supported with available forage primarily because livestock numbers have been down (50 percent voluntary nonuse) due to livestock market fluctuations.

Range improvements would not be constructed within a ¼ mile buffer of the Sweetwater River wild and scenic river segments. This action could prevent improvement of livestock distribution patterns. In addition, expansion of existing livestock operations or entirely new livestock operations would not be expected in allotments with wild and scenic river segments because additional available forage would not be allocated.

There are no known impacts to livestock grazing from management actions described for the Greater Sand Dunes and Natural Corrals ACECs.

Increased design and construction costs for range improvements would be expected for conformance to management actions described in the Monument Valley. In some instances, project construction may not be permitted and grazing distribution patterns would not improve.

No surface occupancy stipulations or buffer zones in the South Pass Historic Landscape, Candidate Plant ACEC and potential habitat areas, and the Cedar Canyon, Pine Springs, and White Mountain Petroglyph ACECs could prevent construction of rangeland improvements, and livestock distribution patterns would not improve. In the Currant Creek Area and the Red Creek ACEC, no surface occupancy stipulations could prevent rangeland improvement project construction. Therefore, livestock reductions could be the only option available to reduce grazing pressure in riparian areas.

Summary

Losses of livestock forage would occur due to mineral development activities, lands actions, and other disturbances affecting approximately 4,568 AUMs. Prescribed burning on 41,000 acres and wildfire would have a short-term impact on forage but should result in long-term productivity of forage.

No surface occupancy requirements affect project placement and development aimed at improving livestock distribution. This would have a long-term affect, and livestock distribution problems would continue for both the short term and long term.

Surface disturbance on 9 allotments (384,000 acres) could disrupt lambing. Land disposal would be considered an irreversible irretrievable loss of forage.

Minerals

Oil and Gas

Table 2-9 shows acres of ownership and development potential for each type of lease restriction. The no leasing restriction removes the lands designated from oil and gas exploration and development by not allowing leasing to occur. The application of a no leasing restriction would remove areas from potential opportunities for the exploration and/or development of oil and gas resources. Approximately 210,150 of these acres have high development potential, while 28,810 acres have moderate potential, and 106,110 acres have low development potential. These no leasing restrictions represent an approximate 72,740-acre increase in planning area lands covered by this restriction compared to Alternative A. This would increase the impact on oil and gas activities over existing management and result in fewer wells drilled.

The no surface occupancy restriction does allow the leasing of restricted lands but would not allow occupancy of the surface for any exploration or development activity. No surface occupancy precludes drilling and exploratory activities in the areas designated. The application of no surface occupancy stipulations would affect 126,560 acres of land with high development potential, while 38,280 acres of moderate potential and 133,210 acres of low potential would be affected. No surface occupancy restrictions represent an approximate 147,010-acre increase in planning area lands covered by this type of restriction compared to Alternative A. The affect of adding this stipulation to a lease would result in adding to the potential costs of drilling exploration and development wells by requiring relocation of well sites outside the restricted area and in some cases requiring the additional expense of pursuing directional drilling to access a reservoir. Also, in some parts of the planning area, the cost of drilling a directional well would be so high that wells would not be drilled because of economic considerations. In addition, the amount of land with a no surface occupancy stipulation, in some locations, would cover such a large area that companies would not have the technical ability to be able to drill wells to access areas in the middle.

Areas with seasonal restrictions would limit occupancy for certain periods of each year. These seasonal restrictions are applied to restrict any surface disturbing activity that would affect certain wildlife categories. The application of this stipulation to leases would affect 820,120 acres of land with high development potential, while 367,080 acres of moderate potential and 655,780 acres of low potential would be affected. These seasonal restrictions represent an approximate 799,560-acre decrease in planning area lands covered by this type of restriction compared to Alternative A. This decrease is due to dropping seasonal restrictions on high value lambing areas. The affect of adding a seasonal stipulation to a lease would result in reducing the amount of time that exploration, development, and production activities can occur in each year. Activity would be concentrated into shorter time periods, increasing costs to those developing the resource.

The application of surface disturbance stipulations to leases would affect 636,750 acres of land with high development potential, while 180,830 acres of moderate potential and 631,610 acres of low potential would be affected (Table 2-9). These surface disturbance restrictions represent an approximate 149,840-acre decrease in lands covered by this type of restriction compared to Alternative A. The affect of adding this type of stipulation to leases results in increased costs of drilling to mitigate impacts or relocating to avoid the restriction. In some cases, the cost of mitigation would be so high that the development activity would no longer be economic to pursue.

The adverse impacts to oil and gas development would be greater than under existing management (Alternative A). In the planning area, 28 fewer wells would be drilled during the 1991 through 2010 time period. Of these 28 wells, 6 would have been located in the Nitchie Gulch Special Study Area, while the other 22 would be scattered throughout the planning area. This would result in reduced production of 51,342 barrels of oil and 1,930,975,000 cubic feet of gas, over this period.

Restrictions in the area of high coalbed methane development potential would have the same impacts as for oil and gas development and would result in 50 fewer wells than under existing management. This is a result of the significant number of restrictions, including no leasing, under this alternative.

The cost of geophysical activities would also be increased, with some activities being limited to certain times of the year or displaced from areas of conflict with other resource values. In some parts of the planning area, restrictions would limit the amount of seismic that can be performed so that complete analysis of the potential resource would not be available before drilling activity occurs. Impacts to geophysical activities would generally be increased over the present situation (Alternative A).

Coal

Under this alternative, it is reasonable to expect that mining operations would continue on those lands held under lease and on those lands that lease applications have been submitted and may be approved for leasing during the time covered by the RMP. Current mining operations are Black Butte/Pit 22, Bridger, Lion Coal, and Pilot Butte coal mines. Proposed lease applications are Deadman Wash and Beans Spring. Map 18 shows in which areas surface disturbance is most likely to occur from coal mining. Tables 4-15, 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-8, and 4-9 also show the estimated amount of yearly coal production and estimated yearly surface disturbance for the present and proposed lease applications. Under this alternative, 430.9 million tons, life of mine, recoverable coal would be available. The average yearly amount of acreage disturbed would be about 670 acres, with an average yearly production of about 16 million tons of coal. There would be about 27 years of minable coal reserves available under this alternative.

All competitive coal lease applications or coal lease modifications received in the greater Cooper Ridge area, the Elk Butte area, and the Deer Butte area would specifically be evaluated for wildlife impacts to winter range habitat (consultation with Wyoming Game and Fish Department would also be done in conjunction with the evaluation). Leasing in these areas would be specifically dependant upon the wildlife winter range impacts and present mining activity within and outside the immediate area, along with the other resource issues.

Development of some known coal areas may not proceed within the area of coal development potential (Map 18). The impact would be a delay or a loss, at a minimum, in developing 127 million tons of known coal reserves resulting in a royalty loss to the state and federal government and a loss to the local area economy. If the coal mineral program is not allowed, reasonable development of the resource, the average yearly production (16 million tons) would begin to decline in 2005. If allowed to decline without consideration for the need of proper lead times for new mine start-ups, coal mining in this area could be nonexistent within 25 to 30 years, and could impact area coal resource users along with increasing cost of local energy needs as they would have to be procured from other areas.

Impacts to the coal program occur from wildlife areas that are removed from mineral development or from restrictions placed on mining operations (e.g., no surface occupancy or limiting leasing of coal areas). The greater Cooper Ridge area, the Elk Butte area, and the Deer Butte area would have some development restrictions after analysis of wildlife impacts from present and proposed mining. Cultural resources would inhibit mining where significant prehistoric and historic sites and sites of religious or spiritual concern to Native Americans are identified; coal would be excluded from surface occupancy or surface mining, and underground mining would be excluded in some areas. Areas identified as candidate plant species would have no surface occupancy. Cost of mitigation in avoidance of these resource issues may leave coal unmined; thus, the coal resource may be lost as it becomes uneconomic as an isolated coal body. This would be a loss to the local area economy and the state and federal government in life of mine revenues.

Visual, air, and water resources impact coal development by increased costs in mitigation. Wetland areas would be managed to enhance other resource values, also increasing coal development costs or leaving isolated unmined coal. Realty action in rights-of-way impact the coal resource by coal being left unmined or adding costs to mitigation in having to move whatever is occupying the right-of-way. Costs incurred from these types of mitigation actions increase the costs of operations which are then passed on to consumers by the coal developer or the operation is abandoned as uneconomic.

Coal surface mining would be prohibited in WSAs and some ACECs. The coal resources within these areas could be lost to the nation's energy needs where subsurface mining is not feasible.

Sodium/Trona

Impacts to sodium would be from air, water, and visual resources. These resource objectives would often increase the cost of sodium development and may inhibit further development in the northern known sodium leasing area.

Locatable Minerals

Additional withdrawals impact mineral location activities the most. Public land withdrawals bar a potential claimant from locating a mining claim on public lands. ACEC lands open to mining claim activity would affect the mining law program to a lesser extent. Potential claimants are not barred from locating mining claims, but any activity other than casual use requires a Plan of Operations and the posting of a bond. Approximately 249,000 acres of existing and proposed ACECs would be affected.

About 3 million acres of existing withdrawals (oil shale and coal) would be revoked and would become available for mineral location, which would result in a benefit to mineral location activities.

Under this alternative, approximately 5,246 acres of existing withdrawals would continue to remain in effect and remain unavailable for mineral location. About 161,355 acres would be withdrawn, resulting in a net of 166,601 acres (or about 4 percent of the planning area) being withdrawn in the long term. Locatable minerals would not be developed in these areas but this affect would be offset by the large acreage of withdrawals to be revoked. Approximately 126,000 of the 166,604 acres are a part of the 3 million acres already withdrawn and no change in current management would occur in those areas, resulting in about 46,600 newly withdrawn acres that were previously open to mineral location.

Approximately 5,260 acres of the proposed South Pass Historic Landmark would be withdrawn and would affect mineral location. Withdrawal of these lands from mineral location would exclude them from any additional locatable minerals exploration and development, other than on claims already existing in this area at the time of withdrawal. The BLM has the option of pursuing validity exams on any such claims within this area. Should such claims be found to be invalid, they would be declared null and void on that basis (and should they be found valid, such claims could be mined and/or patented).

The nomination of the historic trails corridor (50,300 acres public lands) for the National Register of Historic Places means that activities within the corridor must be in compliance with Section 106 of the National Historic Preservation Act. Plans of operation would include prescriptions for 106 compliance which could increase time and costs of exploration.

Mineral Materials

Opportunities for sales would be lost on about 204,397 acres (see Table 2-13). This is only a small portion of the planning area and should not significantly affect the availability of mineral materials area wide.

Areas of surface occupancy are the same as those listed in Table 2-9. This table also lists areas where no surface disturbance is allowed. These no surface occupancy and no surface disturbance areas would adversely impact the use of mineral materials. While mineral material sales may not actually be prohibited in these areas, it is impractical to remove mineral materials from these areas without disturbing or occupying the surface in the process. Mitigation measures would increase the costs of doing business, limit timing of activities, and may preclude some activities.

The disposal of mineral materials from existing sites (i.e., community pits and other disposal sites) would eventually result in the depletion of these same sites, necessitating the establishment of new sites.

Moss rock resources in certain specific areas may be depleted from allowing moss rock common use areas. Topsoil resources would be conserved in response to the recommendation not to establish topsoil sale areas. Allowing blowsand sale/common use areas should have a negligible impact on the total amount of sand resources in the planning area.

Summary

Oil and Gas

Short-term and long-term affects would occur to mineral production and management by closing 465,570 acres to leasing (over 225,000 acres are nondiscretionary closures). No surface occupancy requirements and restrictions on surface disturbance would increase the costs of doing business and possibly preclude some activities.

Approximately 517.9 billion cubic feet of gas and 13.8 million barrels of oil would be produced during the 1991 through 2010 time period. This production would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Coal

Short-term and long-term affects would occur to coal leasing and development due to 12,600 acres determined unsuitable for leasing, 405 acres unacceptable for further leasing consideration, about 49,500 acres unacceptable for surface mining, approximately 13,000 acres limited for surface facilities, and over 300,000 acres subject to further mitigation and/or consultation. Increased costs of mitigation would have short-term and long-term affects on coal production activities by increasing costs and limiting timing of development.

Approximately 324.85 million tons would be produced, which would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Sodium/Trona

Long-term benefits would occur with the entire area being open to leasing. However, short-term and long-term affects would occur through increased costs of mitigation.

Approximately 115 million tons of trona would be produced from within the planning area which would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Mineral Materials

Increased costs of mitigation (approximately 300,000 acres of no surface occupancy and 204,397 acres closed to salable minerals) would increase costs of doing business in both the short and long term. Some unauthorized use would continue. Materials sold would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Locatable Minerals

Approximately 3 million acres of withdrawals would be revoked while 161,354 acres would be subject to new withdrawals. Some lands would be open for development while others would be closed. This could have a short- and long-term affect on the development of locatable minerals. The increased costs of mitigation would also affect locatable mineral development. Additional requirements and mitigation for ACECs would increase costs of doing business for both short- and long-term periods.

Geophysical

Areas closed to geophysical activity result in a loss of data through the long term, and would be considered an unavoidable adverse impact. Increased costs for mitigation would affect operations in both the short and long term. Areas open to vehicle use and exploration activity provide beneficial long-term affects because retrieval of information is allowed. More areas would be closed to vehicle use and limited to designated roads and trails which confines vehicle travel under this alternative and affects would be greater than Alternative A.

Off-Road Vehicles

Under the Preferred Alternative, impacts to off-road vehicle travel would be the same as Alternative A from rights-of-way, fences, acquisitions, WSAs, and seasonal closures. Off-road vehicle use in the Sand Dunes "open" area would be allowed on 10,500 acres. About 3,105,815 acres of the planning area would be limited to existing roads and trails; 343,260 acres would be limited to designated roads and trails; 176,125 acres would be closed to vehicle traffic; and 1,671,040 acres of existing and designated roads and trails would fall under seasonal closures (Table 4-24).

TABLE 4-24

PROPOSED ORV DESIGNATIONS BY ALTERNATIVE (approximate acres)

ORV Designation	Preferred Alternative	Alternative A	Alternative B	Alternative C
Open	10,500	10,500	5,500	10,500
Closed	184,145	221,440	270,700	255,505
Limited to Designated Roads and Trails	343,260	20	1,320	464,340
Limited to Existing Roads and Trails	3,097,795	3,402,730	3,357,170	2,903,940
Seasonal Closures (as needed)[1]	1,671,040	1,671,020	890	1,671,040

[1] Acres do not total because of overlapping designations. Seasonal closure acres are part of acreage included in limited designations.

Timber harvesting activities have a tendency to shift the recreation opportunities in an area from semi-primitive nonmotorized types of activities to those types of activities which occur in semi-primitive motorized settings. Hunting pressure generally increases due to increased road access, as do other off-road vehicle uses including recreational off-road vehicle use, firewood gathering, and similar activities. Most nonmotorized activities are reduced or displaced to other areas. The overall result is usually an increase in use and a change in the type of use.

The following Special Management Areas would be partially closed or closed altogether to off-road vehicle travel (see Table 2-15), displacing off-road vehicle users. Additionally, transportation planning would be done in portions of these areas which could result in confining access and use to specified routes: Candidate Plant areas, Cedar Canyon ACEC, Currant Creek/Sage Creek, Greater Sand Dunes ACEC, Monument Valley Area, Natural Corrals ACEC, Oregon Buttes ACEC, Pine Springs ACEC, Pine Springs Expansion Area, Red Creek ACEC, Red Desert Watershed Area, Tri-State Monument Area, and public lands in White Mountain Petroglyphs ACEC. This amounts to about 6 percent of the planning area and would not be considered a significant affect to users.

Closing the road around the Boar's Tusk would not adversely impact off-road vehicle use by displacing off-road vehicle users because there are alternative routes in the area.

Wild and scenic river management would have a slight adverse impact on off-road vehicle management because users would be displaced from these areas. However, with approximately 8.5 miles of rivers being designated, this would not be a significant impact. The implementation of the proposed cultural resource management actions would impact off-road vehicle use by displacing users in these areas. Seasonal restrictions, reducing and restricting traffic, and limiting off-road vehicle use in certain areas may eliminate and displace users.

The implementation of the "limited to existing roads and trails" designation for public lands in the remainder of the area may pose conflicts in some areas; however, the density of existing roads and "two-track" trails provides access to essentially all of this area. The condition in the limited definition which allows off-road use for "necessary tasks," such as livestock management, essentially allows for existing uses to continue in most cases.

Preparing recreation area management plans, project plans, and providing off-road vehicle designations in the planning area would ensure that dispersed and developed recreation opportunities would continue.

Instituting seasonal closures of roads as required to protect resource values would adversely affect off-road vehicle use by displacing the users and, in some cases, would eliminate use.

Off-road vehicle use in the "open" area of the Sand Dunes (10,500 acres), the only open ORV play area in the planning area, would continue to benefit the ORV community and continue to increase in popularity. Use would continue to increase in the open area because the remainder of the planning area would be limited to existing roads and trails or designated roads. A Recreation Management Area would address the issues (e.g., facility expansion and development and visitor safety), making the sand dunes a locally, and possibly nationally, significant ORV play area. ORV pressure from competitive events and casual use would continue to be a major management challenge. Off-road groups have submitted applications for hill climbs and cross-country races in the past and would continue to do so. These applications have been denied in the past due to conflicting resource values.

Summary

Long-term beneficial impacts would result from the large amount of area available on existing roads and trails for off-road vehicle use and 10,500 open acres. Additional areas closed to off-road vehicle use (less than 5 percent of public lands in the planning area) and those areas limited to designated roads and trails (about 9 percent of public lands in the planning area) would somewhat reduce usable areas for off-road vehicles and restrict vehicle access.

Recreation

The objective of managing for the continued availability of outdoor recreational opportunities, meeting legal requirements for health and safety of visitors, and mitigating conflicts between different types of resource users would solve many of the current problems. Meeting the long-range needs of the public and utilization of recreation resources would be pursued.

The implementation of the proposed cultural resource management actions would in most cases benefit the recreation program. Development of management plans, combined with emphasis on interpretive programs and historic features, would result in increased public awareness and use.

The management of timber resources to maintain current wildlife cover levels would benefit recreation. Existing wildlife populations would be maintained, and a slight increase in hunter or recreation user days would be anticipated.

Recreation-related values would benefit by receiving a high level of priority in relation to protection when evaluating proposed rights-of-way and other realty actions. Public access needs and land exchanges for public benefit could be actively pursued and processed. This, combined with the continued protection of existing recreation resources through avoidance areas and restricted areas, would result in a higher level of use available for recreation purposes, fewer conflicts with landowners, and higher quality experience for the recreating public.

Allocating the portion of unallotted lands that are in riparian areas to wildlife and watershed would be beneficial to the recreation program. This would provide additional wildlife habitat, and potentially, additional recreation user days.

The identified livestock management actions which would improve vegetation cover and forage for wildlife and give consideration to wildlife, watershed, wild horses, and recreation resources in the development of new range improvements would benefit the recreation program.

The application of oil and gas leasing stipulations not allowing surface occupancy on developed recreation sites, and not allowing surface disturbing activities within ¼ mile of 6 developed, 5 semi-developed, and 14 undeveloped recreation sites would benefit those sites. Implementation of these stipulations is essential to public safety and necessary for the protection of the sites.

No surface occupancy in the 14-Mile recreation area unless activities would enhance recreation management and closing 14-Mile to all mineral leasing activities would maintain the integrity of the area.

The application of leasing stipulations to protect wildlife would also benefit recreation because the highest recreational uses in the area (hunting and fishing) are directly tied to wildlife resources. The identified protection of crucial big game winter ranges and sage grouse strutting grounds are essential to the protection of the wildlife populations, upon which much of the recreation use in the area is based.

The implementation of the proposed off-road vehicle estrictions would primarily impact recreational off-road vehicle uses and are discussed in the Off-Road Vehicle section. The impacts to other recreation uses are secondary and for the most part tied to wildlife populations. If big game populations are shown to increase due to establishing the identified ORV limitations, there may be increased hunter use and beneficial recreation impacts.

Limiting large surface-disturbing activities on or within ¼ mile of the Continental Divide Snowmobile Trail would maintain the integrity of the trail.

Writing management plans for developed, semi-developed, and undeveloped recreation sites would ensure that other resource values are considered. Additionally, the plans would address health and safety issues while providing recreational opportunities for the public.

Writing and developing interpretive plans for the area's unique features, such as the Farson Fossil Fish beds, Boar's Tusk, Leucite Hills, and Emmons Cone, would educate the public about diverse resources.

Developing backcountry byways would provide opportunities to interpret diverse resources.

The camping limit of 14 days within a 5-mile radius may inconvenience some users. The limit would help to maintain the quality of the planning area for recreation. Closing crucial wildlife and livestock waters to camping may inconvenience some users but would assure protection of resources.

Special recreation permits and the accompanying mitigation would assure resource protection and public safety.

Management of the Continental Divide National Scenic Trail, Continental Divide Snowmobile Trail, the Green River, and the Wind River Front as special recreation management areas would benefit the recreation user. Recreation planning would help to reduce conflicts with other uses.

Not allowing new recreation sites to be developed in riparian areas would adversely impact recreation development potential. Restricting dispersed camping within a 200-foot buffer zone in riparian areas would adversely impact some popular dispersed sites in the area.

The improvement of wildlife habitat through vegetation treatment may lead to increased wildlife populations which in turn may result in additional hunter days and wildlife viewing opportunities. The proposed treatment for livestock management would also benefit wildlife and may result in a further increase in hunter days and wildlife viewing opportunities.

Hunter and angler days would essentially continue at their current level or possibly increase, which would be an important benefit to the local community. The wildlife management actions identified conflict with off-road vehicle uses, but pose no conflicts with the other recreation programs.

Visual Resource Management changes would provide some benefit to the recreation program because the sensitive use areas would receive protection while still allowing for other appropriate uses to occur.

The identified actions to monitor and protect water quality would also benefit the recreation program by maintaining the high water quality in the area. The protection of riparian areas would also provide protection to recreation uses in riparian areas.

The addition of a wild horse viewing area in the planning area would greatly increase public awareness of that program and allow other resource programs, including recreation, to be interpreted.

Wild and scenic river management would have a slight adverse impact on recreation management because there would be no new developments (e.g., campgrounds) in these areas. However, with approximately 10 miles of rivers being designated, this is not a significant impact.

Summary

It is anticipated that recreation user days would increase by approximately 60 percent over the next 20 years due to the additional influx of people for anticipated mineral development and increased popularity of public lands for recreational activities.

Long-term beneficial impacts would occur to recreation users as recreation use increases and additional facilities become available. Disruption of recreation opportunities in areas of development would occur both over the short and long term. This would be important to the local user but probably not nationally significant.

Socioeconomics

Related socioeconomic tables are located in Appendix 10. Other economic tables, graphs, and charts which were used for the analysis in the document are on file at the Green River Resource Office.

Livestock

Annual Perspective

Annual grazing fee receipts realized by the BLM from AUMs actually utilized by livestock operators would amount to between $336,870 and $374,300. If it were possible to utilize the total 318,647 AUMs of active preference, annual grazing fee receipts would total over $596,000.

It is estimated that direct personal income to livestock sector households would total approximately $1.6 million per year, at current use levels. If the use of total active preference could occur, this figure could rise to almost $2.75 million.

Total Area personal income (direct, indirect, and induced) is increased by activities in the livestock sector. It is estimated that total annual Area personal income would be enhanced by approximately $5.4 million because of livestock sector activities. Should the use of total active preference AUMs be possible, total Area personal income would benefit by over $4.6 million.

The direct value of livestock sector yearly output in the Area would total over $10.5 million. If total active preference were utilized, it would be close to $19 million.

Subsequently, the value of total annual Area output (direct, indirect, and induced) would benefit by approximately $30 million because of livestock sector activities. If it were possible to graze all active preference AUMs, the benefit might increase to about $53 million.

Annual direct employment in the livestock sector is estimated to be about 209 to 232 full-time equivalents (FTEs). This sector would increase total annual Area employment (direct, indirect, and induced) by about 443 to 492 FTEs. Should all active preference AUMs be utilized, direct employment in the livestock sector might reach 370 FTEs and total Area employment might benefit by about 785 FTEs.

Summary

Over the 20 years, direct output value from livestock produced as the result of grazing public land in the resource area would range from about $211 million (assuming current use levels) to $374 million under the maximum AUM use assumption in Alternatives A, C, and Preferred. Direct output would range from $211 million to a maximum of $485 million in Alternative B.

The benefit to total area output from activities related to grazing on public land in the resource area is estimated to range from $596 million (assuming current AUM use levels) to over $1 billion at maximum AUM use levels under Alt. A, C, or Preferred. Under Alt. B, this range would be $596 million to almost $1.4 billion.

Impacts on total area income under Alternatives A, C, or Preferred over the next 20 years is expected to range from $104 million (assuming current AUM use levels) to $183 million given maximum AUM use. For Alternative B, this range would be $104 million to $238 million.

The annual economic impacts listed above result in the following cumulative impacts over the next 20 years:

AUM USE LEVEL	**180,000**	**200,000**	**318,647**
Affected Items			
Grazing Fees ($1,000)	6,750	7,500	11,949
Direct Personal Income (million $)	31	34	55
Total Area Personal Income (million $)	108	118	192
Direct Output (million $)	211	231	376
Total Area Output (million $)	597	654	1,065

Recreation

Comparing 2010 to 1990 and Alternative A

Under this alternative, annual recreation day levels would rise by about 2,320 days each year. By the year 2010, annual recreation days are projected to total 123,707, valued at over $8.68 million per year. This is about 46,390 recreation days and almost $3.26 million per year higher than is estimated for 1990, or for Alternative A in year 2010. The value of total annual Area output (direct, indirect, and induced) could benefit by almost $17.84 million per year and is about $6.69 million more than would be realized under Alternative A.

Direct annual income from recreation is estimated to total almost $2.9 million in 2010, which is about $1.09 million higher than is estimated for Alternative A. Estimated total annual Area income (direct, indirect, and induced) resulting from Area recreation in 2010, could total almost $4.49 million, about $1.68 million higher than under Alternative A.

Direct employment by the recreation sector in the resource area in 2010 is projected to total about 334 FTEs, about 125 FTEs more than under Alternative A. Total (direct, indirect, and induced) Area employment, resulting from resource area recreation in 2010, could reach about 465 FTEs, up about 174 FTEs above estimates for Alternative A.

Summary

Over the 20 years reviewed, direct recreation expenditures under this alternative could have a cumulative value of about $142.71 million, about $34.19 million higher than expenditures under Alternative A. Total cumulative output (direct, indirect, and induced) realized by the Area from recreation during this time is estimated to total about $293.20 million, almost $70.24 million greater than under Alternative A.

Direct cumulative recreation income over the 20 years is projected to total almost $47.62 million, which is about $11.41 million higher than is estimated for Alternative A. Total Area income (direct, indirect, and induced) could be enhanced by recreation over the 20 years by about $73.77 million. This is about $17.67 million more than would probably be realized under Alternative A.

Timber

Annual Perspective

A maximum annual timber harvest of 500,000 board feet is proposed for BLM managed land under this alternative and Alternative C. This is one half as large as the maximum potential harvest proposed under Alternatives A and B.

The direct annual output value of the proposed annual timber harvest could range from $87,500 to $110,000. The benefits to total (direct, indirect, and induced) annual area output from harvests could total between $210,800 and $265,000.

Direct annual income to the timber sector as the result of the maximum harvest level is estimated to range from $19,700 to $24,700. Benefits to total (direct, indirect, and induced) area income from harvesting activities are estimated to amount to between $46,000 and almost $58,000.

Timber activities would result in about 1 more FTE being employed directly by the timber sector, and in total (counting direct employment), about 3 additional FTEs being hired throughout the area.

Summary

SUBJECT	UNITS	PREFERRED ALTERNATIVE AND ALTERNATIVE C	AMOUNT ALTERNATIVE C AND PREFERRED ALTERNATIVE ARE LESS THAN ALTERNATIVE A AND ALTERNATIVE B
Maximum Harvest	MBF	500	500
Price/MBF	Dollars	175 to 220	None
Direct Output Value	$1,000		
At 500 MBF/YR			
@175/MBF		1,750	None
@220/MBF		2,200	None
At 1,000 MBF/YR			
@175/MBF			1,750
@220/MBF			2,200
Total Output Value	$1,000		
At 500 MBF/YR			
@175/MBF		4,216	None
@220/MBF		5,300	None

SUBJECT	UNITS	PREFERRED ALTERNATIVE AND ALTERNATIVE C	AMOUNT ALTERNATIVE C AND PREFERRED ALTERNATIVE ARE LESS THAN ALTERNATIVE A AND ALTERNATIVE B
At 1,000 MBF/YR			
@175/MBF			4,216
@220/MBF			5,300
Direct Sector Income	$1,000		
At 500 MBF/YR			
@175/MBF		394	None
@220/MBF		494	None
At 1,000 MBF/YR			
@175/MBF			394
@220/MBF			494
Total Area Income	$1,000		
At 500 MBF/YR			
@175/MBF		920	None
@220/MBF		1,158	None
At 1,000 MBF/YR			
@175/MBF			920
@220/MBF			1,158

Since the maximum timber harvest proposed for Alternatives A and B is twice as large as that proposed for the Preferred Alternative and Alternative C, Alternatives A and B have the potential of producing twice as much output and income for the area, both annually and over the 20 years.

Sodium/Trona

Annual trona production is estimated to be about 5 million tons from 1990 through 1995 (Appendix 10). However, in 1995, annual output would rise to 6 million tons and remain at this level through 2010. The cumulative value of output production for the 20 years 1991-2010 would total almost $7.8 billion. The total economic output (direct, indirect, and induced) in the area is increased by the trona/soda ash production by almost $14 billion over the 20 years.

Employment related to trona production would probably rise somewhat. Since trona output is projected to rise by about 20 percent beginning in 1996, it is estimated that subsequent annual direct employment by the industry could rise by over 100 persons and this, in turn, could result in some additional indirect and induced employment in the planning area.

Oil and Gas

Annual Perspective

Under the assumptions for oil and gas, output does not vary greatly among the Preferred Alternative, Alternative A, and Alternative C. For all of these alternatives, highest output for oil and gas during the 20 years covered by the analysis is projected to occur in 1996.

Of these three alternatives, Alternative A is expected to produce the highest annual output of oil and gas over the 20-year period. Under this alternative, the 1996 oil output is projected to reach about 725,952 barrels, valued at over $14.5 million. In this same year, the Preferred Alternative and Alternative C are projected to produce 725,554 barrels and 723,962 barrels, respectively. In either case, the direct output value of 1996 production would be approximately $14.5 million.

Under Alternative A, 1996 gas production is expected to total almost 27.31 billion cubic feet, valued at over $27.3 million. By comparison, 1996 production under the Preferred Alternative and Alternative C is projected at 27.3 billion cubic feet and 27.24 billion cubic feet, respectively. The direct output value of 1996 production under these two alternatives would be slightly under $27.3 million.

For all three alternatives, oil and gas output is projected to trend downward after the 1996 high point. By the year 2010, direct output value for oil is estimated to range between $12.4 million and $12.7 million and gas output values between $23.4 million and $23.8 million.

Impacts to total 1996 area output (direct, indirect, and induced) resulting from 1996 oil output under these alternatives would range between about $21.8 million and $21.9 million. This benefit to total area output would decline to between $18.7 million and about $19 million in 2010. Impacts to total 1996 area output resulting from 1996 gas output is expected to amount to about $41 million. By 2010, this annual economic impact from gas production would decline to between $35 million and $36 million.

Under these three alternatives, direct income in the oil sector is projected to total approximately $1.2 million in 1996, dropping to about $1 million by 2010. Benefits to total area income (direct, indirect, and induced) from oil output is expected to amount to about $2.4 million in 1996 and about $2 million in 2010.

Direct income produced by the gas sector under any of these three alternatives is estimated to be slightly over $2.2 million in 1996, declining to slightly under $2 million by 2010. Subsequently, total income effects for the area from gas production could be almost $4.6 million in 1996, declining to under $4 million by 2010.

Annual direct employment related to the oil/gas activities proposed under these alternatives would peak at about 500 FTE in 1996 and range from 423 to 428 in 2010. Total employment (direct, indirect, and induced) in the area resulting from oil/gas activities under these alternatives would peak at about 1,728 to 1,732 in 1996 and decline to around 1,465 to 1,482 in 2010.

Summary

Cumulative oil output over the 20 years for the Preferred Alternative, Alternative A, and Alternative C is projected to be 13,768,412 barrels, 13,819,755 barrels, and 13,742,144 barrels, respectively. Corresponding direct output values are expected to be about $275.4 million, $276.4 million, and $274.8 million. The subsequent impacts on total area output value are projected to be approximately $416.3 million for Alternative A, $413.9 million for Alternative C, and $414.7 million for the Preferred Alternative.

Gas output over this same time period is estimated to total 519.976925 billion cubic feet under Alternative A, 517.056800 billion cubic feet under C, and 518.045950 billion cubic feet under the Preferred Alternative. Corresponding direct output values are projected to be about $520 million, $517 million, and $518 million. Subsequent impacts on total area output could amount to over $783.1 million for Alternative A, $778.7 million for C, and $780.2 million for the Preferred Alternative.

Cumulative direct income in the oil sector over the 20 years is expected to range between $22.5 million and $22.7 million relative to these three alternatives. Total income (direct, indirect, and induced) generated in the area as the result of oil activities over the 20 years is expected to range between $46 million and $46.3 million.

Cumulative direct income from the gas sector over this time period is estimated to range between $42.4 million and $42.7 million, under these three alternatives. Total income generated in the area as the result of gas activities under these alternatives over the 20 years could total about $86.6 million to slightly over $87 million.

Coal

Annual Perspective

Under both the Preferred Alternative and Alternative A, the combined annual output from all active mines in the Green River Resource Area could rise from about 11.9 million tons in the base year (1990) to a high of 18.4 million in the year 2005. Output is expected to total 12.8 million tons in 2010.

The direct annual output value from mine operations and related coal sales are expected to reach a peak in 2005 of almost $328 million, compared to an estimated $212 million in 1990. By 2010 this direct output value is projected to decline to approximately $228 million. Coal output sales are estimated to add almost $589 million to total (direct, indirect, and induced) area output in 2005, compared to almost $381 million in 1990. By 2010, the contribution of area coal activity to total annual area output is expected to decline to slightly under $410 million.

Direct personal income realized by coal sector households from resource area coal operations is estimated to have been about $38 million in 1990. Such income is expected to rise to over $58 million by 2005, and then decline to almost $41 million by 2010. Total personal income (direct plus indirect and induced) gained by households as the result of resource area coal activities is estimated to have been over $68 million in 1990. Under these alternatives, it is expected to rise to almost $106 million by 2005, but by 2010 to total under $74 million.

According to reports by the State Inspector of Mines of Wyoming, direct employment by resource area coal mines in 1990 totaled about 939 FTEs. The estimated impact of resource area coal mining activities on total (direct plus indirect and induced) area employment numbers in 1990 was about 2,442 FTEs (University of Wyoming, Input/Output Model). When resource area coal activity is at its peak in 2005, direct employment is projected to rise to 1,286 FTEs, and total area employment (direct, indirect, and induced) is expected to benefit by 3,345 FTEs. By 2010, direct area coal sector employment is expected to be only 1,036 FTEs and total area employment should benefit by almost 2,695 FTEs.

Summary

Under these alternatives, cumulative coal output of resource area mines over the next 20 years is expected to be about 325 million tons, with a direct sales value of approximately $5.8 billion. This level of coal output/value could raise total (direct, indirect, and induced) output by almost $10.4 billion over the 20 years.

Direct coal sector household income is projected to benefit by about $1 billion over the 20 years and total area household income (direct plus indirect and induced) by almost $1.9 billion as the result of projected coal activities.

Coalbed Methane

Annual Perspective

Under the Preferred Alternative and Alternative C, the highest projected number of producing wells (192) would occur in the year 2000. However, the highest annual output of methane is expected to occur in 1997 at almost 23.71 billion cubic feet under the "no tax credit" example. At $1.00 per thousand cubic feet, the value of this output would be slightly over $23.7 million. By the year 2000, production under the "no tax credit" example is projected to decline roughly one-third from its 1997 high.

In the "tax credit" example the highest annual output is in year 1998 at approximately 13.98 billion cubic feet, valued at almost $14 million. By 2000, production in the "tax credit" example would be about one-quarter below its 1998 high.

Under the Preferred Alternative and Alternative C, it is estimated that coalbed methane activities in 1997 would contribute (at minimum) from about $ 20.7 million to $35.7 million to total (direct, indirect, and induced) area output. In 1998, this range would be about $21 million to $34.6 million as production from wells benefiting from tax credits rise somewhat while output from the more productive wells begins to decline. These figures indicate that it takes slightly longer for production to rise and benefits to be realized from the less productive wells, which are being assisted by tax credits, than from the other wells in the area.

Direct income to coalbed methane sector households in the 1997 year is projected to range from $1 million to almost $2 million. In 1998, the next highest year, this range would be from about $1 million to almost $1.9 million. By comparison, by 2000 this income benefit is expected to drop to a range of about $0.9 million to $1.3 million.

The level of coalbed methane activities proposed under these alternatives for 1997 could result in an increase in total (direct, indirect, and induced) area income of between $2 million and $4 million. In 1998, this range is projected to lie between $2.3 million and about $3.9 million. By 2000, the contribution to total area income is expected to decline to a range of about $1.8 million to slightly over $2.7 million.

Under these alternatives, direct employment by the coalbed methane sector would be highest at 121 FTEs in 1995, when wells drilled are expected to reach 50. By 2000, when wells drilled drop to 5/year and producing wells total 192, direct employment is expected to total 64 FTEs.

In 1995, projected coalbed methane activities could add about 419 FTEs to the area's total (direct, indirect, and induced) employment. By 2000, this benefit is expected to decline to around 222 FTEs.

Summary

Projections for the Preferred Alternative and Alternative C place minimum output potential for coalbed methane over the 20 years (1991-2010) at about 78.63 billion cubic feet to 134.25 billion cubic feet. At $1.00 per thousand cubic feet, this amounts to between $78.6 million and $134.3 million in direct output value at the well head. The minimum contribution of 20 years of coalbed methane activity to total (direct, indirect, and induced) area output is expected to amount to between $118 million and $202.2 million.

Direct income accruing to area households from coalbed methane activities during this time period is estimated to be at least $6 million to $11 million. The minimum contribution to total (direct, indirect, and induced) area income could amount to between $13 million and $22.5 million over the 20 years.

Vegetation

Management actions implemented to control dust along dirt roads would permit vegetation to be more productive and vigorous. Selective requirements imposed on prescribed burns in order to avoid violation of ambient air quality standards could increase burn costs and alter prescribed burn plans. Industrial plant stack emissions could alter plant communities in the immediate vicinity and downwind from the emission source.

Generally, stipulations and management actions implemented to protect cultural and paleontological resources would prevent surface disturbance and vegetation removal. Limitations imposed within the visual horizon of designated and nondesignated historic trails could alter areas considered for prescribed burning and range improvement construction thereby facilitating localized overuse of vegetation due to poor livestock distribution. Concentrated invertebrate and vertebrate fossil collection causes surface disturbance and results in removal of vegetation.

Prescribed burning would cause a long-term decrease in shrub species, a short-term increase in annual weeds, and a long-term increase in grass species on approximately 67,700 acres. Total vegetative production would decline for the first two growing seasons following a prescribed burn. After the second year, livestock and certain wildlife (elk) forage would increase, and range condition and total forage production would improve in the third year after a prescribed burn. Prescribed burns in decadent aspen stands would, with proper grazing management, stimulate sprouting and reproduction of aspen and alter age class structure. Prescribed burns conducted during the hot season or during low soil moisture conditions would limit sprouting and regeneration of certain mountain shrub species, primarily antelope bitterbrush, and could cause less diverse species composition and longer post-burn recovery periods. Cool season burns or burns conducted during periods of high soil moisture would provide greater opportunity for mountain shrub regeneration and sprouting, and would provide greater species diversity and shorter recovery periods.

Wildfires cause a short-term loss of vegetation and livestock forage on rangelands. Within three years, livestock and certain big game (elk) forage would generally exceed original levels as grasses replace shrubs. The surface disturbance associated with fire line construction, the use of heavy equipment, and other fire suppression activity often damages or destroys vegetation and accelerates natural soil erosion. In forested areas, wildfire changes the vegetative composition from forest to the open grass/shrub type. Wildfires usually occur on the high and low density sagebrush, juniper, conifer, and aspen LANDSAT classifications.

Management actions described for commercial forest lands, especially along the Wind River front would reduce age class structure and plant species diversity. Construction of access roads to timber sales would remove vegetation for at least 10 years unless the road is used by the public, in which case vegetation would be permanently removed. Forest management activities in commercial stands would generally be limited to the conifer LANDSAT classification. Management on woodland and commercial forests in the Little and Pine Mountain compartments would generally have no detrimental effects to vegetative communities and would improve plant species diversity, health, vigor, and age class structure.

Generally, hazardous waste management activities would not impact vegetative resources, although illegal hazardous waste dumping or spills could damage or totally remove vegetation from the immediate vicinity of the dump or spill.

With the exception of desert land entries, most of the impacts to vegetation from lands and realty actions are covered under impacts to livestock grazing in terms of forage (AUMs) lost. Farming activity associated with desert land entry would cause vegetation to be replaced by irrigated crops or hay. Crop production would change vegetative composition and would involve such activities as tilling the soil, seeding crops, irrigating, applying fertilizers, herbicides, and insecticides, and harvesting. Desert land entries would generally occur on the saltbush, low density sagebrush, greasewood, and high density sagebrush LANDSAT classifications.

The possible sale of public land would have no significant impacts to vegetative resources. No significant rare plants are known to exist on lands identified as potentially suitable for disposal. Any significant vegetative resources on these lands would probably be discovered in site specific investigations that would be conducted during evaluation of sale proposals. In such cases, effects on vegetation would be mitigated by appropriate wording in the patent, or the sale would be denied if necessary.

At current livestock use levels of 180,000 AUMs, the localized overuse of forage would continue to affect riparian and wetland values by causing increased soil erosion, compaction, and invasion of less desirable plant species. Localized overuse of forage can result when too many animals graze in an area for too long a time. When forage is overused, plants cannot provide for their own growth, maintenance, and reproduction, so they are eventually replaced by less desirable species, many of which produce little or no forage value. If livestock use levels increase to active preference of 318,641 AUMs over the next 20 years, more widespread overuse of forage could be expected in riparian areas as well as on uplands. Range conditions and trend could be expected to decline and less desirable plant species would increase.

Although 12 LANDSAT classifications would be affected by livestock grazing, most impacts would occur on the saltbush, low density sagebrush, high density sagebrush, aspen, riparian, and greasewood classifications.

Rangeland project construction and implementation would remove vegetation from 105 acres which could be expected to rehabilitate after 20 years. Water developments, including wells, springs, and pipelines should improve livestock and wildlife distribution patterns and encourage more uniform utilization of forage and cause less damage to certain vegetation types. Reduced grazing pressure would reduce vegetation damage, soil compaction, and erosion. Project construction would be most prevalent in the low density sagebrush, high density sagebrush, greasewood, and riparian LANDSAT classifications. Mechanical manipulation of vegetation (chaining, chemicals, contour furrowing, ripping, etc.) has not been identified but has not been ruled out. These activities would result in a change in vegetation composition and would temporarily remove target species. Chemicals used to remove sagebrush and noxious weeds could impact nontarget vegetation on localized areas.

Fencing would be used to improve forage and habitat condition on upland and wetland sites. Range condition should improve on localized areas where fences are used to implement AMPs or better distribute livestock. In wetlands, fencing would control livestock use and improve habitat and watershed condition. More diverse vegetation would be produced and soil erosion would be reduced.

Livestock conversions from sheep to cattle would generally cause additional utilization of riparian vegetation. Conversions from cattle to sheep would generally result in greater utilization of upland areas and shrub species.

Allocation of forage that is unallotted would cause greater utilization of forage that is currently unavailable for livestock grazing. Increased utilization could result in species composition changes or a decrease in vegetative production and vigor.

Impacts to vegetation due to mineral activity are generally expressed in terms of AUMs lost or temporarily removed pending reclamation. Construction of drill pads, roads, facilities, pipelines, powerlines, and other structures associated with oil and gas operations would result in the loss or removal of vegetation from 24,310 acres over the next 20 years. Reclamation of disturbed sites would be accomplished on approximately 14,325 acres; therefore, total net loss of vegetation is expected to be approximately 9,985 acres over the next 20 years.

Activity associated with coalbed methane projects are expected to remove vegetation from approximately 3,510 acres over the next 10 years. Reclamation of disturbed sites is expected to occur on approximately 1,927 acres; therefore, there would be a net long-term loss of vegetation from approximately 1,223 acres.

Coal mining at the Bridger, Deadman Wash, Black Butte, Elk Butte, Stansbury, and Lion Coal Mines is expected to remove vegetation from approximately 24,500 acres over the next 20 years. Reclamation of disturbed sites is expected to occur on approximately 15,790 acres; therefore, there would be a net long-term loss of vegetation of approximately 8,710 acres. Reclamation efforts would probably not return impacted vegetative communities to a natural state, at least for the next 50 years or so, and would require non-native vegetation be seeded to rapidly stabilize soils.

Vegetation would be disturbed by activities associated with mining of other leasables, salables, and locatables. In most cases, only a small acreage would be disturbed.

Geophysical exploration activities would usually disturb less than one acre of vegetation per mile of operation. All new disturbance would be reclaimed after exploration.

Repeated off-road vehicle use would damage vegetation because vehicle tires crush and tear plant tissues and eventually destroy plant cover. ORV activity often occurs in areas that are too steep or erosive for road construction. The combination of vegetation loss and activity on steep erosive soils produces excessive soil erosion and causes further impacts associated with sedimentation on adjacent areas. All vegetation classifications would be damaged by off-road vehicle use, but such damage would be most common on badlands, high and low density sagebrush, juniper, saltbush, and sand dune LANDSAT classifications.

Recreation area support facility construction would remove vegetation. Concentrated recreational activities, especially around and near riparian areas can damage vegetation through trampling, digging, cutting, or pulling. ORV rallies, cross country races, and other such events would damage or totally remove vegetation from the event route.

Management actions implemented to protect candidate plant populations and potential habitat areas would generally protect other vegetative resources. Restriction of surface disturbing activities in actual and potential candidate plant habitat areas would prevent construction of rangeland improvements and prescribed burns and hence grazing distribution patterns may not improve and greater forage utilization levels could be expected.

Management actions described to protect visual qualities, wild and scenic rivers, special management areas, wildlife habitat, watershed values and to reduce channel erosion would generally benefit and protect native vegetative communities. Some short-term disturbance of vegetation could be expected due to construction of wildlife habitat and watershed improvement projects.

Proposed wild horse numbers would be at a level that would stabilize current range conditions in most of the herd areas. Continued concentration of wild horses near water sources could severely damage vegetation in localized areas through trampling, trailing, and overgrazing. Promotion of wild horse grazing in dry areas through the development of 15 water sources would reduce localized overgrazing and trampling of vegetation, but would remove vegetation from approximately 23 acres and facilitate grazing of vegetation currently not available for horse use. Designation of the Little Colorado Desert as a wild horse herd area with an AML of 69 to 100 animals would not have a significant impact to vegetation because the horses are currently there and most allotments have large amounts of nonuse.

Summary

There would be a short-term increase of annual weeds and a short-term decrease in vegetation production on the 67,000 acres proposed for prescribed burns. However, there would be a long-term increase in grass species and vegetation production. Wildfire would create a similar affect for both short and long term. The affects of wildlife are not anticipated to be significant.

Localized overuse of forage would continue and could increase if full livestock grazing preference is achieved. Riparian areas could decline over the long term.

A short-term impact would occur from the construction of rangeland improvement projects removing vegetation (about 105 AUMs); however, a long-term benefit to overall vegetation production, through improved distribution, would occur.

Approximately 20,150 acres of mostly low density sagebrush would be lost over the long term due to development activities. In specific areas, this could be important, but planning area wide it is not expected to be significant.

Land disposal would result in an irreversible and irretrievable loss of the vegetation resource as most disposals are for urban expansion or industrial development.

Visual Resources

The overall impact to existing visual resources would be to provide protection to the sensitive viewsheds in the area and provide a more accurate rating of the visual management needs.

The initiation of a program to improve the visual quality of the oil fields would benefit the visual resources in those areas and, in many cases, would benefit other resources such as soil, watershed, and vegetation. The avoidance of identified areas not suitable for linear rights-of-way would protect the sensitive visual resources in these areas.

Protecting National Historic Trails and other trails by not allowing visual disturbance, no surface occupancy on cultural sites and limiting geophysical vehicles to designated roads and trails in the South Pass Historic Landscape would enhance visual values and protect the visual sensitivity of these areas.

Actions such as maintaining, improving, or restoring riparian values to provide enhanced forage, habitat, and stream quality; managing all other forest lands for watershed, wildlife, and scenic values would benefit visual values and, in some areas, improve the classification.

Vegetation treatment prescriptions such as treatment units within VRM Class II areas would not exceed 40 acres in size unless site specific analysis determines that VRM Class II objectives would be met and would enhance visual resources. Maintaining vegetative buffer strips between developed recreational facilities and live water would have a beneficial affect to visual resources.

Not allowing surface mining activities and surface occupancy areas around the Boar's Tusk and the Steamboat Mountain - Killpecker Dunes fields would retain and enhance visual resources.

In designated special management areas, such as ACECs, a plan of operations is required for any surface disturbance activities, regardless of acreage, which would help maintain visual resources. bout 31,390 acres or 9 percent of the planning area would provide benefits to visual values.

Limiting geophysical vehicles to designated roads and trails in the South Pass Historic Landscape would protect the VRM resources there.

Establishing a "greenbelt" along the Green River would enhance visual resources. Buffers around recreation sites near riparian areas would enhance visual resources.

Under the Preferred Alternative, there would be a slight change to the VRM classifications from Alternative A with 75,700 more acres managed for class II visual values. Class III areas and rehabilitation areas would be managed the same as Alternative A.

About 76 percent of the planning area (2,783,000 acres) would be managed as Class IV. Modification to the landscape would be dominant. Visual resources would not be protected on this area. However, every effort and opportunity would be taken to screen and paint facilities to blend in with the natural landscape. This could result in a loss of visual resources. This would be less than Alternative A by 75,000 acres.

Management of BLM-administered lands in accordance with visual standards to protect, maintain, enhance, and rehabilitate areas would enhance visual resources.

Recommending approximately 9.7 miles of the Sweetwater River as suitable for inclusion in the wild and scenic river system would maintain the integrity of the visual values for the area. Management prescriptions for the Big Sandy River segments would protect scenic values within ¼ mile of the centerline of river corridors.

The ORV designation of the majority of the planning area as "limited to existing roads and trails" would be compatible with the visual designations, and in some cases, would prevent the degradation of the visual quality resulting from new disturbance and roads. Not allowing hill climbs would protect visual resources.

Summary

Long-term benefits would result from improvement and rehabilitation of area values and management prescriptions for Class II areas. Linear facilities such as roads and pipelines would have a long-term affect on visual resources due to their high visibility and the extended periods of time for natural vegetation cover to become re-established.

Short-term effects would occur to visual quality from smoke associated with prescribed fire and wildfire and the subsequent modification of vegetation, and dust from development and logging activities. Reduced air quality from development and natural causes would have an individual short-term affect. Approximately 76,460 acres would be disturbed over the next 20 years and about 31,719 acres would remain disturbed over the long term. The level of affected air quality cannot be determined but is not anticipated to be significant for the whole planning area.

Watershed/Soils

Cultural resource data recovery excavations, because of their limited area extent, minimally affect soils although locally the impacts can be quite destructive. Proposed projects suggest 7 to 10 acres per year would be disturbed which could generate maximum soil losses of 350 to 500 tons per acre per year.

Fire suppression would cause soil erosion in burned areas at rates dependent on the intensity of the fire and suppression efforts. Full suppression could lead to soil losses of up to 15 tons per acre. Prescribed burns generally affect soil much less than firefighting efforts. Soil loss may increase immediately after the burns due to the removal of vegetation. However, productivity should increase 2 to 3 years after burning with accompanying reductions in soil losses.

There would be controlled timber harvest on the Wind River front with an emphasis on watershed without augmenting stream flows above capacity. The only possible problem which might develop is an uncontrolled road system pioneered by firewood cutters.

Rejuvenation of aspen by fire on Pine Mountain and Little Mountain may create more mass wasting, but, with a well conceived plan and temporal and spacial layout of the burns or treatments, this may be avoided.

Although timber harvest is a minor activity, public demand for firewood is not. This activity has an associated high road density which routes storm runoff causing rill and gully formation on and below the road. This provides more sediment transport and erosion than that of a natural condition.

Land actions such as rights-of-ways for linear actions such as pipelines and roads can adversely affect watershed resources. Because of the extent of these rights-of-way and resulting runoff, a very large amount of sediment, salt, and phosphate would be produced.

Restrictions on Desert Land Entries would prevent unsuitable soils from being cultivated, thereby limiting sediments and salts from entering the Green River/Colorado River system.

Impacts to water and soil resources from grazing are caused by over-utilization of the riparian areas where soil compaction and vegetative removal can create bank instability. This leads to loss of channel stability and results in higher sediment, salt, and phosphate loads. Formulation of AMPs with emphasis on riparian area management would greatly improve riparian areas over the next 20 years.

Placing salt next to streams and springs causes soil compaction and creates an area denuded of vegetation and saturated with salt. The results of this are much the same as over-utilization. Long-term adverse effects should be reduced with the implementation of guidelines to keep salt blocks 500 feet from streams.

The emphasis of the minerals program is the largest, most obvious impact to the water and soil resources. Impacts include sedimentation, soil contamination, salt and phosphate loading, groundwater contamination, bank and channel instability, loss of aquifers, retort leachate production, augmented flows, and water disposal. Contamination of the Superior sole source aquifer is of concern. The recharge Ericson aquifer would accommodate surface occupancy thereby increasing the possibility of spills directly on the recharge area.

Strip mining of coal has some unique impacts associated with it. The most important impacts are the complete recontouring and denuding of the landscape and the backfilling of industrial wastes associated with mining into the open pits. The result of the recontouring and denuding can create a situation that augments flood flows unless retention ponds are used. These flows, if allowed to go unchecked, can force stream channels in the area to regrade themselves in response to such flows. This commonly results in incision and widening of the stream bed thus causing more sedimentation, salt, and phosphate loading. However, with the proper sediment catch basins and other runoff control, the presently operating coal mines are not expected to pose that much of a problem to the Bitter Creek watershed.

Soil contamination from drilling fluids and accompanying chemicals for production drilling continue to threaten area soils. Unlined reserve pits offer no protection from contamination to surrounding soils. Burying drilling muds in reserve pits has the potential of limiting soil development and fertility. Oil base drilling muds can contain benzene or other hazardous chemicals.

Off-road vehicle use can often impact water and soil resources if done in an uncontrolled manner. The largest impact from off-road vehicle use is sediment production and erosion from uncontrolled stream crossings and riparian area compaction from numerous poorly placed 4-wheel drive roads.

Designation of areas suitable for rallies and cross country races would have local adverse impacts on soil conditions through compaction and disturbance of the surface layers. Proper monitoring and rehabilitation should restrict the extent of soil damage. Any such designated areas must be closely examined before approval is given.

Outdoor recreation centered around water bodies can affect bank stability along lakes and streams. Lack of channel stability can affect the stability of the riparian zone on which most camping and other activities occur. Compaction and or loss of the riparian area greatly reduces stream stability which in turn increases sediment, salt, and phosphate loads. Use of a 200-foot buffer strip between perennial water and camping may eliminate some of the impacts.

Another impact to water resources is the sewage pollution associated with recreating close to, or in, the water. If such activity becomes too large, often the sewage generated from such heavy use would result in eutrophication of downstream water bodies and would increase the likelihood of water-borne diseases.

Overuse of riparian areas by recreation interests can lead to reduced shading of the water along streams as the woody riparian vegetation is stripped from the banks. This loss of shade can increase stream temperatures within a stream reach such that the dissolved oxygen required by fish is reduced to below acceptable levels.

Impacts from vegetation removal by fire or other means can have adverse impacts on stream hydraulics. Vegetative removal can cause an augmented flow regime which forces the stream channel to readjust its width and depth to accommodate the larger flows.

Vegetation manipulation to enhance wildlife habitat would cause localized short-term impacts to physical and chemical characteristics of soils, increasing erosion susceptibility through the loss of both ground cover and litter accumulation. Over the long term, vegetation should increase over pretreatment production levels which would decrease the erosion hazard. The proposed burn on Little Mountain could influence the dynamics of unstable soils causing mass movement on unstable landscapes.

Impacts from instream fisheries projects can drastically change the channel dynamics as well as the physical position of the stream channel if not properly placed. The use of instream structures in the past have been a haphazard process where little attention was given to the location or size of the structure. This has created a situation where at the very least the structure failed or at worst where the channel moved and created more instability problems than before.

Summary

The Preferred Alternative would provide for rehabilitation of present and future disturbances. Constraints on burning of vegetation on steep slopes would help control sediment, although some short-term impacts from sediment would occur. Revoking withdrawals would allow locatable mineral development which could cause an increase in sedimentation and siltation. Not leasing areas for mineral development and constraining locations of roads and rights-of-way would reduce accelerated silt and salt loading.

The watershed condition in Red Creek would improve under this alternative due to closing portions of the area to mineral leasing and sales and precluding development activity. Completing a road plan to rehabilitate some roads and upgrade others would have a long-term benefit. Overall, human-caused erosion would be reduced.

While there would be surface-disturbance restrictions on steep slopes or in areas of known landslide potential, some development may occur in such areas resulting in slumping and accelerated soil loss which would be locally important but not significant. In areas of high landslide potential such as on the south face of Little Mountain, the likelihood of construction triggering slippage would increase, especially on toe slopes.

Long-term benefits would occur to watershed resources from mitigation measures and particularly no surface occupancy areas preventing disruption of soil and watershed values. Additional prescriptions to protect watershed and to manage special areas would reduce watershed impacts and provide an added benefit.

Wild Horses

Management actions described in the Preferred Alternative would generally benefit wild horse management. A total of 17,400 AUMs would be provided to support an appropriate management level (AML) of 1,450 horses. A new wild horse management area would be established in the Little Colorado Desert. The AML in the new area would be 100 horses and populations would range from 69 to 100.

Fence construction in the wild horse herd management areas would be restricted to enhance multiple-use management and not interfere with the movement of the horses. Fifteen water developments would be constructed in crucial winter ranges when in conformance with wildlife objectives. Water development construction would cause a minor impact, and it is expected that 2 AUMs would not be available to wild horses. Long-term improvement in forage conditions could be expected due to improved wild horse distribution patterns.

The development of a selective gathering and fertility program would benefit wild horse management. This action would allow herds to be managed for specific conditions, special colors, and markings and should aid in gathering on 2-year cycles.

The development, evaluation, and revision of wild horse herd management plans would benefit wild horses. These activity plans contain objectives for the management of the horses and multiple-use management of other resources.

There would be no expected impacts to wild horses from management actions described for Air Quality, Watershed, Recreation, and Forestry.

Avoidance of significant cultural sites, limitations on activities within ¼ mile of historic trails, and subordination of activities to historic landscape values in some areas may constrain the BLM's ability to construct rangeland improvements aimed at achieving better distribution and management of livestock and wild horses. Additional survey and design costs could be necessary to avoid effects to cultural resources.

Surface disturbance due to fossil collection, if kept in the Farson area, would not affect wild horse management.

No known impact would be expected to wild horse management due to fire suppression activities. Prescribed burns and wild fires would cause a short-term loss of forage for wild horses but a net long-term gain of forage condition and availability after approximately 2 years.

Sediment ponds used by the mineral industry and hazardous waste spills could be hazards to wild horses.

Management actions described for the lands and minerals programs would reduce available forage in the planning area. Approximately 54,749 acres (or 4,568 AUMs) would be disturbed and not reclaimed (Table 4-23). A majority of this forage loss would occur in wild horse herd management areas.

The active grazing preference level of 318,647 AUMs would be maintained for livestock. The allotment categorization would not impact wild horse management. Fences would be constructed to not interfere with the free roaming nature of the wild horses. The range improvements proposed would not impact wild horses. It is anticipated that the livestock actual use levels would remain in the range of 180,000 to 200,000 AUMs per year. If this level of grazing continues, competition for forage between wild horses and livestock would remain minimal.

Some harassment of wild horses from off-road vehicle users would continue.

The no surface occupancy stipulation on 3,110 acres of candidate plant sites and inventory requirement for 36,550 acres of potential habitat should not have an impact to wild horse management but could limit the locations available for rangeland improvement construction or increase project survey and design costs. Wild horse grazing distribution patterns may not improve if rangeland improvement project construction is limited.

The design and construction costs for wild horse improvements could increase to conform with VRM Classes II and III standards. The ½ mile buffer around the proposed wild horse viewing areas may cause a problem since the only way to hold horses in an area may be with a range improvement such as a water development.

The impacts to wild horses due to management actions described for the Steamboat Special Management Area would be minimal. The Divide Basin wild horse area borders this special management area and horses occasionally stray into the area.

The segments of both rivers nominated for wild and scenic designation lie outside of any wild horse management areas. Therefore, there would be no known impacts to wild horses or their management.

There would be no impacts to wild horse management due to management actions described for the White Mountain Petroglyphs, Pine Springs, Cedar Canyon, and Red Creek ACECs. These areas do not lie within any wild horse management areas.

The Natural Corrals and Greater Sand Dunes ACECs and the Red Desert Watershed Area lie within the Divide Basin herd area. No known impacts or conflicts are anticipated with management actions described for these areas. Some impact could be expected due to no surface occupancy stipulations described for the Oregon Buttes ACEC, but at this time no wild horse improvements are planned in the area.

There would be no known impacts to wild horse management due to management actions described for the Currant Creek special management area, although it does lie within the Salt Wells Wild Horse Herd Area.

The Monument Valley special management area lies within the Adobe Town herd area. With the present livestock use and wildlife numbers, there would be no known impacts or conflicts with wild horse management

There could be an impact to horse management due to no surface occupancy stipulations on 5,260 acres in the South Pass Historic Landmark. This action could prevent construction of water developments needed to reduce overgrazing caused by wild horses.

Wild horses would be placed under stress as a result of being captured. Some horses may be killed or injured. However, according to past experience, this number would be less than one percent of the horses gathered.

Summary

Short-term and long-term losses of forage would occur due to development activities, material sales, and rangeland improvements affecting approximately 3,000 AUMs. Prescribed burning on 67,000 acres and wildfire would have a short-term impact on forage but should result in a long-term increase in productivity of forage.

No surface occupancy requirements affect project placement and development aimed at improving wild horse distribution (107 acres). This could have a long-term affect, and distribution problems would continue for both the short term and long term.

Approximately 30 AUMs would be lost over the long term due to construction of range improvements in wild horse herd areas. Development of 15 water facilities would provide a long-term benefit to horses by improving distribution patterns. A short-term vegetation loss would occur during construction. A long-term increase to full livestock grazing preference could create competition for forage.

Wildlife

Managing Steamboat Mountain and Boar's Tusk-Killpecker dunes to protect natural and geologic features may give added protection to some wildlife populations.

There is concern over commercial timber harvest in the Wind River Mountains. Pine and Little Mountain management would benefit wildlife habitat. A 25-acre clearcut management prescription could reduce calving and fawning areas and reduce the quantity and quality of arboreal wildlife habitat by about 13 acres annually.

Linear rights-of-way would be excluded in the Currant Creek watershed and avoided in the Red Creek ACEC. This would reduce erosion and loss of crucial Colorado River cutthroat trout habitat and decrease silt loading to the Green River and Flaming Gorge.

Some localized overuse of forage and trampling damage presently occurs in uplands and riparian habitats under the current livestock grazing level of 180,000 AUMs. In many of the allotments where grazing levels are substantially below preference, habitats are generally improving.

Under the Preferred Alternative, livestock use would continue to be licensed both in kind and in season of use. Some allotments contain lands unsuitable for livestock grazing. Other areas are suitable only for certain classes of livestock. During the development of AMPs, available livestock forage would be based on suitability criteria (slope, badlands, distance from water, etc.) which would generally benefit wildlife. Maintaining an active grazing preference of 318,641 AUMs could result in a downward trend in vegetation quantity, quality, and species composition and diversity even with implementation of AMPs and range improvements.

About 75 percent of riparian habitats would be in proper functioning condition within 10 years which would provide benefits to wildlife habitat.

Fences, even when properly designed, result in some wildlife mortality (big game animals, low flying birds, predators, and prey species). Fences constructed across migration corridors of big game increase stress, and may lead to increased loss in big game reproduction and direct mortality, especially during severe winters. Herding of livestock is preferred to fencing where adverse impacts to wildlife are contemplated. Fences on public lands would continue to cause direct and indirect wildlife mortality. Fences create a hazard to sage grouse, raptors, waterfowl, and other non-game species to a certain degree. Fences constructed across migration routes would continue to adversely affect big game, especially during severe winters.

Construction of livestock water developments within crucial big game winter ranges could have adverse impacts to big game populations and habitat. This could increase forage consumption by livestock and wildlife and would reduce available forage for wintering big game. Constructing water developments outside of crucial big game habitat could lesson competition for forage between livestock and big game. This may not adversely impact crucial big game habitat.

Authorizing livestock water developments in crucial winter ranges, ridgetop habitats, and low precipitation areas (less than 9 inches/year) may potentially reduce wildlife species richness by 10 to 15 percent. Wildlife would not benefit from these water developments as they probably would not be operated during critical periods when livestock are not in the area.

Inaccurate conversion ratios (sheep to cattle) and no application of suitability criteria has caused concentrated livestock use in riparian habitats (i.e., Sugarloaf and Red Creek allotments) where upland topography is poorly suited for cattle. Conversions from sheep to cattle have also resulted in more habitat competition to wildlife especially in relation to streams, wetlands, and big game parturition ranges.

Closing Palmer Draw and special exclosures to livestock grazing would protect them from deterioration.

Unallocated forage may go to livestock and not benefit wildlife habitat.

Anticipated oil and gas activities may impact approximately 246 raptor nests, 1,020 acres of sage grouse nesting habitat and cover, and 7,230 acres of big game crucial winter range. The majority of impacts would be associated with maintenance and operation activities. Areas of anticipated activity include the Greater Nitchie Gulch (765 acres), Little Colorado Desert (1,525 acres), and Wamsutter Arch (555 acres) oil and gas fields. The remainder of the planning area would have approximately 4,385 acres of disturbance within crucial big game winter ranges (Table 4-25). Greater Nitchie contains approximately 92 percent crucial big game habitat (primarily elk and deer), Little Colorado Desert contains approximately 38 percent crucial big game habitat (deer, antelope, and moose), Wamsutter Arch contains approximately 19 percent (antelope), and the remainder of the planning area contains about 36 percent crucial habitat.

TABLE 4-25

SUMMARY OF IMPACTS TO WILDLIFE (ESTIMATES)

Impact	Preferred Alternative	Alternative A	Alternative B	Alternative C
Big game habitat losses (acres)	45,411	46,174	58,509	42,560
Crucial winter range losses (fluids) (acres)	7,230	7,320	15,625	7,216
Big game habitat displacement (habitat there but not usable) (acres)	143,000	162,159	183,892	143,000
Raptor habitat loss (may overlap with big game losses) (acres)	15,050	15,050	17,500	10,000
Number of raptor nests lost or unusable (mineral activity)	432	453	483	353
Crucial winter range loss/displacement potential for antelope in KSLA (trona) (%)	3	3	5	3
Sage grouse habitat loss (fluids - may overlap big game) (acres)	1,160	1,160	1,600	900
Geophysical affect on big game habitat (linear, long term, miles)	840	865	1,000	700
Potential stream habitat affected (locatable) (miles)	150	150	150	150
Irretrievable lands disposals (may be offset partially by acquisitions) (acres)	13,525	9,605	13,705	13,525

Oil and gas development and maintenance activities in the Nitchie Gulch area have caused forage loss for big game and displacement from established habitats. Recently, elk were displaced from habitat in this area. In 20 years, about two-thirds of the area could again be available for elk use.

Big game habitat loss results from road construction and road use, pad construction, pipeline construction, field facility maintenance, and disturbance zones around these areas. Cumulative effects of yearlong livestock activity compound habitat impacts through displacement, forage competition, water competition, and social interaction.

Actual wildlife habitat lost over the next 20 years due to oil and gas development would amount to an estimated 4,012 acres in the Little Colorado desert, 3,084 acres in Wamsutter Arch, 872 acres in Greater Nitchie Gulch, and 12,300 acres in the remainder of the planning area (total 20,268 acres). These acreages would not be fully reclaimed and portions would remain out of usable habitat for wildlife for 20 years or more. Limited rainfall, poor soils, and severe winter conditions make reclamation difficult, increasing the time required to re-establish suitable vegetation to pre-disturbance composition and density.

Seasonal stipulations would not provide adequate long-term protection for wildlife. Development of long-term land use activities would continue to displace wildlife and disrupt nesting/fawning areas during operation of the activity.

The planning area has a proposal for 20,491 acres of coalbed methane development with other proposals being developed. Long-term big game habitat loss from exploration, development, and production may amount to 2,572 acres. Elk and antelope displacement (short term, temporary loss) from roads and other human activity amounts to about 67,700 and 24,300 acres, respectively. Coalbed methane development under this proposal could displace 300 to 400 of the Steamboat/Sands elk herd and may cause them to leave the plains habitat and move to the Wind River Mountains and other areas of suitable habitat.

An estimated 24,300 acres of crucial antelope winter range in the Killpecker drainage may be adversely impacted by displacement, animal stress, and forage loss for 20 years or more. Estimated big game habitat destroyed from road, pad, pipelines, and plant construction could amount to 2,572 acres.

Mining and associated activities could remove 22,000 acres of big game habitat over the short term. Even after some reclamation, an estimated 22,800 acres would be lost for big game use over the long term. Surface mining of coal could adversely affect about 186 raptor nests and about 15,050 acres of suitable raptor habitat.

The known sodium leasing area in the planning area is open for development with protective and no surface occupancy (NSO) stipulations within this alternative. In the trona deposition area, 177,885 acres are designated as crucial pronghorn winter habitat. According to the Sodium Mineral Development Environmental Assessment, 3 percent of the crucial antelope winter range within the known sodium leasing area would be disturbed.

Riparian areas, wetlands, and other high value wildlife habitats may be adversely affected under this alternative if mining for locatable minerals under the 1872 Mining Law were to occur. Habitats where mineral exploration and development could occur include approximately 150 miles of streams, 99,800 acres of crucial big game habitat, and approximately 71,700 acres of raptor habitat. Potential adverse activities associated with this kind of development include loss of wetland and riparian habitats, contamination of streams, and big game habitat disturbance of calving, fawning, and crucial winter ranges. Potential development of gold (53 acres) and jade (6 acres) was analyzed under this alternative. Potential adverse activities associated with this kind of development include access and haul road development, waste water and tailings disposal, vegetation removal, soil contamination, noise, dust, and human activity.

Zeolite exploration and extraction is expected to occur over 205 acres in highly erodible soils which have value for both raptors and antelope. This mineral is found within a trophy antelope management area. Transportation and extraction of this mineral could adversely affect at least four raptor nests, two prairie dog colonies, and two perennial streams.

Reclamation could result in altered vegetation communities or introductions of undesirable plant species. Under this alternative, trails created by geophysical operations could become roads after use by other ORVs, thereby reducing available habitat for wildlife. Seismograph activities may disrupt sage grouse reproduction (breeding and nesting). Short-term impacts may displace wildlife from 390 miles annually and each year 42 miles of new line may require long-term reclamation.

Under ORV management prescriptions, adverse impacts to wildlife should be minimal. Beneficial impacts from a higher level of ORV management and enforcement could reduce stream siltation, improve plant density, and reduce stress to wildlife.

Recreation management actions discussed under this alternative should mitigate adverse impacts to wildlife. Some displacement during high density recreation use would still occur. Wildlife would be temporarily displaced during hunting seasons and dune rallies and some long-term habitat loss would occur when campgrounds are developed. Adverse impacts to nesting raptors adjacent to recreation areas is anticipated.

Chemical treatment of rangelands could adversely affect amount and quality of available forage and cover for wildlife.

Vegetation treatment in riparian areas and river islands can enhance wildlife habitats and improve forage and plant diversity. Spawning areas could be adversely impacted in the short term due to silt deposition following treatment if not protected through buffer strips.

Management actions taken under Visual Resource Management would have beneficial benefits to wildlife and wildlife habitat.

Summary

Management actions under this alternative would show reduced adverse impacts to wildlife when compared to Alternatives A and B but more than Alternative C.

Adverse impacts to crucial wildlife habitats (i.e., riparian areas, crucial winter ranges, parturition areas, etc.) from livestock grazing could increase if all current nonuse AUMs are used. Development of new AMPs and/or revision of old AMPs to include riparian objectives or to protect other crucial wildlife habitats would occur during the next 20 years and benefits would accrue slowly.

Seasonal stipulations would be used to mitigate impacts to wildlife during crucial periods and would provide short-term protection for wildlife. Long-term maintenance and operations activities in crucial wildlife habitats would continue to cause displacement of wildlife from crucial habitats, including disruption of nesting, fawning and calving areas, and crucial big game winter habitats.

Surface disturbing activities would continue to cause long-term losses of wildlife habitat. Overall, less acres would be disturbed than under Alternatives A and B.

Management prescriptions under this alternative would provide long-term benefits as in Alternative A. Displacement and loss of habitat from development and disruptive activities would create an unavoidable adverse impact (see Table 4-25). This affect would be the same or somewhat greater than under Alternative A, due to potential coal and locatable mineral development. Fire could result in a long-term loss of habitat and would be considered an unavoidable adverse impact to the habitat.

Land disposals on 13,043 acres would result in an irretrievable loss of wildlife habitat. However, this is offset somewhat through proposed acquisitions to enhance wildlife habitat. Generally, big game winter habitat is involved in the disposal and fisheries and riparian habitat is proposed to be acquired. Surface mining can result in an irreversible irretrievable loss of wetlands and springs, and although off-site mitigation occurs, the original site is lost. Highway and major road development also results in irretrievable losses of habitat as they are generally permanent structures. Long-term impacts would continue to occur to wildlife habitat due to production activities and year round use in crucial areas. This impact would be reduced from Alternatives A and B.

Special Management Areas

Candidate Plants

About 440 acres of actual plant populations and 30,900 acres of potential habitat would be affected. Wildfire and related suppression activities, areas where livestock concentrate (salting and watering), chemical control of noxious weeds, geophysical activity in potential habitat areas, off-road vehicle use, increased recreation use, trampling by wild horses, closure or expansion of the McKinnon dump, and conversions of sheep to cattle all contribute to an irreversible irretrievable loss of the plant populations. However, additional restrictions on geophysical activity, off-road vehicle use, and fire suppression activities and a proposed 440-acre withdrawal would reduce the level of impact from Alternative A. Grandfathered mining claim activity and unauthorized uses could create an unavoidable adverse impact and could result in an irretrievable loss of plant populations.

Cedar Canyon ACEC

The major petroglyph in the Cedar Canyon ACEC would be beneficially affected by management prescriptions. A 20-acre exclusion area around the petroglyph would be protected from most intrusions which would respect spiritual concerns expressed by Native Americans. Other areas within the ACEC, including small isolated petroglyph sites, would not have this same level of protection. These archeological sites, other than the 20-acre petroglyph site, would generally be dealt with under standard Section 106 compliance prescriptions which could result in some adverse effects to them. The 20-acre petroglyph site would be an exclusion area for rights-of-way which would offer increased protection for this site.

Management activities in Cedar Canyon could have some long-term adverse impacts on ACEC values, but impacts would be reduced from Alternatives A and B due to additional management prescriptions and restrictions. Visual intrusions that could destroy the integrity of the setting of the petroglyphs would be reduced due to preventing such activities within ½ mile and the proposed 515-acre withdrawal. Opportunity would be provided for Native American rituals. Displacement of big game from crucial winter range habitat would continue over the long term due to continued traffic and road use, construction, and production activities. Habitat availability could decline with further development activities. A reclamation plan would be prepared to reclaim disturbed areas which should reduce this impact from that described in Alternative A. Impacts to erosive soils would be reduced by restricting off-road vehicle use to designated roads and trails and preventing over-the-snow vehicle use.

Coal management prescriptions such as surface mining or facilities would benefit the resources in the ACEC.

Greater Sand Dunes ACEC

In the western portion, no impacts are anticipated with implementation of the prescribed management actions and restrictions and with implementation of the Interim Management Guidelines for Lands Under Wilderness Review.

In the eastern portion, management prescriptions and restrictions would be designed to preserve and protect the geological, cultural, visual, and wildlife values associated with the Greater Sand Dunes ACEC. Implementation of the prescribed measures would reduce or minimize impacts associated with mineral development, lands actions, and off-road vehicle use. Residual impacts would be minor and would include:

> Seasonal displacement of wildlife, predominantly elk and deer as well as wild horses, would occur through off-road vehicle activity. Seasonal displacement would be most prevalent during the summer and fall months.
>
> Loss of vegetation on stable dunes would potentially occur through the development of oil and gas reserves and through facilities associated with oil and gas development. Potential oil and gas development in the 6,000 acres open to 3 wells per section could disturb up to 98 additional acres. Oil and gas development in the area open to 1 well per section (10,390 acres) could disturb an additional 57 acres. Reductions in the visual integrity of the area would result from development of up to 40 new oil and gas wells. Surface facilities (e.g., pipelines, snow fencing, etc.) would create safety hazards to off-road vehicle users.
>
> Dune ponds and related riparian habitat would continue to be affected by livestock, wild horses, and wildlife use.

Benefits that would be realized through the management prescriptions and restrictions include the protection of sensitive cultural resource sites, Crookston Ranch, and protection of the Native American religious and important geological values associated with the Boar's Tusk.

Additional benefits would occur from the acquisition of approximately 1,920 acres to consolidate public lands in the dune area which would enhance wilderness, visual, and wildlife values; the removal of abandoned facilities and the marking of known hazard areas would reduce some of the potential impacts to off-road vehicle users; the retention of forage and native plant compositions for wildlife and the retention of 10,390 acres as an "open" ORV area for recreational uses.

Monument Valley Area

Managing cultural resources under standard Section 106 compliance procedures should prevent any significant cultural resources from being impacted, without appropriate mitigation and consultation within the compliance process. The area would remain a target area for further Class II level cultural resources inventory should funds become available for that purpose. Required inventory for paleontological resources and appropriate stipulations would also prevent loss of scientific data or significant fossil resources.

Some long-term impacts may occur to soils, slopes, and visual values due to activities on adjacent private lands requiring access across public lands. Silt production and sedimentation would occur; however, this would be minor. Revocation of existing mineral withdrawals would open the area to exploration and development of locatable minerals which would also affect watershed and vegetation resources. Measures to control erosion, such as restricting surface disturbance on slopes greater than 25 percent and on erosive soils and restricting off-road vehicle travel to designated roads and trails, should lessen these impacts and should benefit watershed and vegetation resources.

Unauthorized use could continue and result in an irretrievable loss of soil, cultural, and paleontological resources. Management of the area would provide for solitude and dispersed recreation but no additional facilities would be provided. Management of wild horses would benefit area values. Oil and gas management and production would benefit in the short and long term.

Natural Corrals ACEC

Management prescriptions, including the existing withdrawal, road closure, and other protective measures in management of the Natural Corrals ACEC, would have beneficial effects on cultural, wildlife, and visual resources.

Unauthorized uses such as off-road vehicle use would adversely affect cultural, geological, and wildlife values. Wildlife and livestock grazing would adversely affect riparian zones in the short term.

Locatable mineral development activities outside the withdrawal area would adversely affect resource values for the long term and would cause an irretrievable loss of resource values.

Oregon Buttes ACEC

The natural values of the Oregon Buttes ACEC would benefit from resource management prescriptions. Dispersed non-motorized recreation use would benefit area values; however, some use would be limited because of the inability to utilize vehicles for access.

Pine Springs ACEC and Proposed Expansion

Retention of the existing ACEC and addition of acreage to encompass large concentrations of stone circle archeological sites would be beneficial to cultural resources in the long term. Protective measures, the additional withdrawal (730 acres), and NSO provision on all 6,030 acres would guarantee integrity of both the stratified archeological site at Pine Springs and the stone circle sites in the Twin Butte area.

Unauthorized uses could result in an irreversible irretrievable loss of area values. Maintenance of range improvements could have a short-term impact to area values.

Red Desert Watershed Area

Management prescriptions in areas such as the proposed South Pass Historic Landmark and candidate species would provide benefits for resources in those portions of the area. Management prescriptions for the remainder of the area would allow some development activities which could cause localized adverse affects; however, these would not have a significant impact on the watershed.

Cultural resources would be adequately managed under the Section 106 compliance procedures which would prevent any significant effects to cultural resources.

Long-term impacts could occur to visual values from construction of facilities. However, most activity is anticipated to occur in the southern checkerboard portion adjacent to and outside the area, and visual impacts would be localized to this area. Off-road vehicle use would be limited to existing roads and trails which would reduce erosion and visual degradation. Development activities remove vegetation creating a short-term loss of the vegetation resource with some long-term loss of shrubs as restoration requires 20 years or longer. Impacts to vegetation affects available AUMs for livestock and horses and wildlife habitat. The amount affected would be less than Alternative A and would not be significant.

Management under the Preferred (as with Alternative C) would maximize opportunity for solitude and dispersed recreation. No significant adverse impacts would occur.

Approximately 10 wells would be drilled in the area, and both short- and long-term impacts would be minimal. Coal mining in relation to the Bridger Mine and Deadman Wash proposed project would affect only a small portion of the watershed.

South Pass Historic Landscape

Designation of the area as a Rural Historic Landscape ACEC would draw appropriate attention to the historical significance of the area. Management prescriptions for the historic trails corridor and the National Historic Landmark would protect historical and visual values within the most significant portions of the region. Restrictions on geophysical exploration, and limiting rights-of-way would help to preserve the regions historical and visual integrity.

A withdrawal of 5,260 acres would ensure protection from mining claim location, and NSO prescriptions on 33,000 acres would preclude activities that could degrade visual and historic values. Designation as an ACEC would place additional constraints on locatable mineral activity. Wildfire and related suppression activities could affect visual resource values and cause additional surface disturbance. However, this disturbance is expected to be minimal.

Limiting all vehicles to designated roads and trails on 33,000 acres would reduce short- and long-term impacts to cultural values. Unauthorized vehicle use would adversely affect landscape values.

Steamboat Mountain Area

This alternative would provide the greatest benefit in the long term, other than Alternative C, to the elk herd and elk habitat within the proposed ACEC. Until leases expires and a leasing plan is in place, coalbed methane development and similar development activities within the Steamboat Mountain Area and surrounding areas may displace 300 to 400 of the 600 elk in the Steamboat/Sands elk herd and could alter and reduce the viability of this herd. Human activity in this desert environment could disrupt elk for a distance of 0.75 miles to 2.5 miles. Most of the Steamboat/Sands elk calving habitats (87 percent) are within potential coalbed methane areas. An estimated 67,700 acres of crucial elk range could be affected. Effects from development of coal, oil and gas, and coalbed methane within this region could result in the inability to maintain the continued viability of this elk herd. However, once leases are withheld and a leasing plan completed, these impacts would be minimized under this alternative and long-term impacts reduced significantly from Alternative A.

Designation as an ACEC requires a plan of development for locatable mineral activity and pursual of withdrawal if necessary, and would place additional constraints on locatable mineral activity, but help protect area values. Leasing may eventually be allowed but only after protection of resource values in the ACEC is assured. Opportunities for development of mineral resources would not be lost.

Tri-State Monument Area

Management prescriptions for this area and designating 293,228 acres of the Red Creek ACEC, Currant Creek, and Sage Creek areas as an ACEC would offer protection for watershed and fisheries resource values. Watershed and fisheries resources would receive the greatest benefit under this alternative.

Protection for watershed and fisheries resource values would provide benefits to these resources under this alternative.

Measures to control erosion would be generally beneficial to cultural resources by curtailing natural deterioration of numerous buried archeological sites within these drainages.

Watershed and fisheries resources would receive greater benefit than Alternatives A and B, but fewer benefits than under Alternative C. Withdrawing 73,860 acres in Currant Creek and Red Creek would prevent locatable mining exploration which could add to sediment loads. The mineral withdrawals to be revoked would remove some protection throughout the proposed ACEC; however, the new withdrawals would offset this impact.

Coal mining activities would be restricted to subsurface mining activities with only limited surface facilities. This prescription would benefit resource values in the area and no adverse impacts would be anticipated.

The no surface occupancy requirement for 73,860 acres within Currant Creek and Red Creek along with no mineral leasing on 50,120 acres in Red Creek, would ensure long-term reductions in sediment loading and enhancement of fisheries habitat. Road closures and closing the right-of-way concentration route through Red Creek to further development would result in long-term benefits to the area and an overall reduction in produced sediment. The designation of Currant Creek as an exclusion area to rights-of-way would also reduce sediment loads. The exclusion of rights-of-way in Currant Creek and the avoidance of rights-of-way throughout the area would require major reroutes of facilities around this proposed ACEC. Closure to mineral leasing, mineral location, sodium exploration, and mineral sales would mean a loss of revenue from mineral resource development.

Short-term impacts would occur from vegetation manipulation but should result in long-term benefits. Implementation of riparian management objectives would provide improved riparian areas in the long term. Currant Creek would benefit from the no surface occupancy and wildfire suppression restrictions. Sage Creek would benefit over the long term from the preparation of plans to mitigate impacts prior to disrupting and disturbing activities. ORV activity which would be limited to designated roads and trails could, over the long term, reduce adverse affects to water quality, watershed values, and fisheries habitat.

Wildfire and suppression activities could remove vegetation which would contribute to accelerated erosion. Additional management prescriptions would reduce overall short- and long-term impacts to ACEC values.

Red Creek Portion

The proposed actions for the Red Creek area provide for a number of activities which are expected to decrease erosion. These include physical erosion control structures, improvements in livestock and wildlife grazing management, and reclamation or improvement of road and trails. Since the object of the proposal is to reduce accelerated erosion, and therefore sediment and salinity into the Green River, it is expected that sediment would decrease in proportion to the number of proposed projects actually completed. Soil loss could be reduced from about 84,000 tons per year to 60,000 tons with total implementation.

Soil erosion rates should decrease in the long term with improved grazing management, road closures, and restrictions on development. Areas along drainages should develop more vegetative cover with 2 to 3 years rest. This would be especially significant to the regrowth of willows and cottonwoods in the riparian areas. Soil aggregate destruction and compaction should be reduced, thereby increasing soil infiltration rates and decreasing surface runoff. Closure and reclamation of up to 35 miles of roads and trails would reduce soil loss by about 5 to 10 tons/mile.

Since no major pipelines would be allowed to be located in the watershed, no new disturbance would be initiated.

A no leasing requirement on Red Creek would keep any new disturbance such as well pads, gravel pits, and associated roads from augmenting the present disturbance.

Only those roads necessary for management of the area would be kept open and the remainder obliterated and put to bed. This action would eliminate large amounts of sediment from getting into the Red Creek channel.

For the most part, any timber removal would be insignificant, since only a small acreage of the timber resource exists in the Red Creek watershed and what does exist is only found on the watershed boundary.

No grazing would allowed on 800 acres of riparian areas throughout the watershed for 3 years. This would allow for the re-establishment of mature willow stands in the Red Creek floodplain thereby reducing the bed load and suspended sediment emanating from the watershed.

Closing the right-of-way concentration route through Red Creek to further development would result in long-term benefits to the area and an overall reduction in produced sediment.

Accelerated human-caused erosion and sedimentation would noticeably be reduced which would have a beneficial effect on water quality.

Natural geologic erosion would continue for both the short and long term and would be considered an unavoidable adverse impact.

White Mountain Petroglyphs ACEC

This alternative would protect the petroglyphs and support Native American spiritual and religious concerns as well as the surrounding 500 acres. No development would be allowed unless it were for the benefit of the cultural resource. Long-term benefits would be realized by restricting any activity that could degrade the site. Benefits would also be provided to the public and especially the local communities through the educational opportunities provided by the area. Unauthorized uses could damage petroglyphs and impact area values.

Wild and Scenic Rivers

Designation and interim management prescriptions would provide a beneficial impact and protect wild and scenic river values on the Sweetwater River for the long term. Some impacts may occur from mining claim activity, but the probability is slight.

Preferred Alternative Summary

This alternative would cause minimal adverse impact to soil, watershed, and cultural and historical resources. Long-term benefits should result o air and visual quality, watershed, and vegetation resources. Adverse impacts to wildlife would be reduced in the long term, although displacement could still occur in some areas during the short term. Riparian areas would stabilize and improve and overall range condition would improve. Most important high potential mineral resources could be developed but with increased costs. Rights-of-way would be accommodated but routing would be restricted and costs would increase.

More opportunities for coal development would occur over Alternative A, as less area has been determined unsuitable for further leasing consideration. Proposed additional inventory and analysis should alleviate unacceptable impacts identified in Alternative B, while providing opportunities for development and economic benefit that were denied in Alternative C.

ALTERNATIVE A (NO ACTION ALTERNATIVE)

Assumptions

In addition to the Assumptions and Assessment Guidelines for all alternatives, these assumptions for lands and realty, livestock grazing, mineral, and socioeconomics specifically apply to Alternative A, the No Action Alternative.

Lands and Realty

About 9,123 acres would be identified as possibly suitable for disposal through sale/exchange actions. About 30,770 acres are proposed for land acquisition which includes 640 acres for ACECs, 40 acres for cultural, 840 acres for riparian, 4,480 for state inholdings in WSAs, 3,040 acres for wild and scenic rivers, 3,380 acres for wildlife, 18,300 acres for watershed, and 50 acres for public access. Approximate acreage of additional withdrawals would be 34,859 acres. All withdrawals would be retained.

Land Use Authorizations

During a 20-year period, an average of 200 permits, 2 leases, and 1,667 rights-of-way would be issued.

Table 4-14 shows the number and acres of authorizations over a 20-year period. Not all authorizations result in surface disturbance.

Estimated total acreage disturbed over a 20-year period would be 8,325 acres (this does not include the 5,480 acres of road associated with oil, gas, and coalbed methane production shown under Oil and Gas and Coalbed Methane Assumptions).

Estimated total acreage reclaimed over a 20-year period would be 6,500 acres (this does not include the 1,000 acres of oil and gas roads relinquished and reclaimed shown under Oil and Gas Assumptions).

Lands would be provided for Desert Land Entries and Agricultural Leases.

Withdrawal Revocations

Table 2-7 presents the withdrawals that would be revoked or retained for each alternative.

All existing withdrawals would be retained under Alternative A.

Livestock Grazing

Adequate forage is available for current wildlife objective numbers. About 26,700 acres would be treated by using prescribed burns to improve forage. Anticipated actual use would be the actual preference of 318,647 AUMs.

Minerals

Coal Operations

The impacts would be the same as the Preferred Alternative. It is reasonable to expect that mining operations would continue on those lands currently held under lease and on lands where lease applications have been submitted and may be approved for leasing over the next 20 years. Current mining operations are Black Butte/Pit 22, Bridger, Lion Coal, and Pilot Butte coal mines. It is assumed that two areas would have new surface mining operations within the next 5 to 15 years. The Deadman Wash tract and the Beans Spring area would have coal mining activity to support local and interstate markets. Map 74 shows the areas in which this surface disturbance is most likely to occur. Table 4-15 shows the estimated amount of yearly coal production and total production from mining these areas. About 430.9 million tons, life of mine, recoverable coal would be available. The average yearly amount of disturbance would be about 670 acres with an average production of about 16 million tons of coal.

Oil and Gas and Coalbed Methane

Tables of Projected Drilling Activity and Associated Surface Disturbance were prepared for the planning area (Table 4-26), each of the 3 Special Study Areas (Table 4-17; Table 4-27; and Table 4-19), and for coalbed methane (Table 4-28). Table 4-11 projects annual production rates of oil and gas through 2010.

Off-Road Vehicles

1990 data show that 342,550 visitor hours (28,546 visitor days) were spent in the planning area. It is anticipated that visitor use days would increase by approximately 60 percent over 20 years due to the natural increase in people anticipated from mineral development as expressed in the historical trends of recreation increase as reflected in the annual Recreation Management Information System (RMIS) Report.

Socioeconomics

Livestock assumptions are the same as discussed in the Preferred Alternative.

The resource area has not had a timber harvest in the last several years because none of the timber put up for sale has been sold. However, for the sake of this analysis, it is assumed that the proposed timber sales would be completed by BLM each year over the 20 years and that the wholesale value of the resulting timber at the mill would be between $175 and $220 per thousand board feet. It is also assumed that the timber from these sales would be milled at sawmills in Afton, Evanston, or Mountain View.

Since there has not been any BLM timber harvested, it is difficult to estimate what products might be produced under this alternative. However, it is thought that studs and mine timbers would be produced from the larger timber and mine spikes and chips from smaller logs. The prices used in this analysis are studs ($175/thousand board feet) and mine timbers ($195 to $220/thousand board feet).

TABLE 4-26

PROJECTED DRILLING ACTIVITY (1990 - 2010) AND ASSOCIATED SURFACE DISTURBANCE GREEN RIVER RESOURCE AREA (Alternatives A and B)

A. Most Probable Future Projection[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Alternative A																					
1. Wells Drilled	70	138	207	274	341	407	473	538	602	666	729	792	854	915	976	1036	1096	1155	1213	1271	1328
2. Expected Producers[2]	44	87	130	173	215	256	298	339	379	420	459	499	538	576	615	653	690	728	764	801	837
3. Expected D&A	26	51	77	101	126	151	175	199	223	246	270	293	316	339	361	383	406	427	449	470	491
4. Abandoned Producers[3]	12	28	49	89	109	157	186	241	303	362	440	486	547	623	660	682	697	738	780	818	961[6]
5. Total Producers (1,712 as of 12/89)	1744	1771	1793	1796	1818	1811	1824	1810	1788	1770	1731	1725	1703	1665	1667	1665	1705	1702	1696	1695	1588
6. Acres of Surface Disturbance	10435	11203	11979	12739	13493	14235	14982	15715	16435	17161	17868	18580	19279	19965	20656	21319	22006	22677	23328	23985	24629
7. Acres Stabilized[4]	488	1069	1456	2085	2718	3384	4129	4774	5550	6232	7035	7865	8681	9583	10325	11134	12010	12692	13004	13851	14537
8. Net Long-Term Disturbance[5]	9947	10134	10523	10654	10775	10851	10853	10941	10885	10929	10833	10715	10598	10382	10331	10185	9996	9985	10324	10134	10092
B. Maximum Future Projection[1]																					
Alternative B																					
1. Wells Drilled	103	208	315	423	532	643	756	869	985	1102	1220	1340	1461	1584	1708	1834	1961	2090	2220	2352	2485
2. Expected Producers[2]	65	131	198	266	335	405	476	547	621	694	769	844	920	998	1076	1155	1235	1317	1399	1482	1565
3. Expected D&A	38	77	117	157	197	238	280	322	364	408	451	496	541	586	632	679	726	773	821	870	920
4. Abandoned Producers[3]	12	28	49	89	109	157	186	241	303	362	440	486	547	623	660	682	697	738	780	818	9616
5. Total Producers (1,712 as of 12/89)	1765	1815	1861	1889	1938	1960	2002	2018	2030	2044	2041	2070	2085	2087	2128	2185	2250	2291	2331	2376	2316
6. Acres of Surface Disturbance	10809	11992	13197	14415	15646	16899	18172	19446	20760	22075	23410	24760	26124	27514	28912	3033	31764	33223	34690	36178	37674
7. Acres Stabilized [4]	488	1069	1456	2354	3287	4262	5340	6326	7469	8532	9726	10980	12225	13575	14780	16069	17449	18642	19776	20884	22139
8. Net Long-Term Disturbance[5]	10321	10923	11741	12061	12359	12637	12832	13120	13291	13543	13684	13780	13899	13939	14132	14262	14315	14581	14914	15294	15535

[1] Cumulative Totals

[2] Success Ratio = 0.63

[3] Gas Well Productive Life = 20 Years; Oil Well Productive Life = 50 Years

[4] Assume 3-Year Stabilization

[5] Row 8 = Row 6 - Row 7

[6] The total number of gas wells drilled in 1990 not available

TABLE 4-27

PROJECTED DRILLING ACTIVITY (1990 - 2010) AND ASSOCIATED SURFACE DISTURBANCE GREATER NITCHIE GULCH (Alternatives A and B)

A. Most Probable Future Projection[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Alternative A																					
1. Wells Drilled	3	5	8	10	12	15	17	19	21	23	25	27	29	31	32	34	36	37	39	41	42
2. Expected Producers[2]	2	3	5	6	8	9	11	12	13	14	16	17	18	20	20	21	23	23	25	26	26
3. Expected D&A	1	2	3	4	4	6	6	7	8	9	9	10	11	11	12	13	13	14	14	15	16
4. Abandoned Producers[3]	2	8	15	17	19	20	21	23	24	25	27	28	30	33	34	36	38	48	58	72	76
5. Total Producers (72 as of 12/89)	72	67	62	61	61	61	62	61	61	61	61	61	60	59	58	57	57	49	39	26	22
6. Acres of Surface Disturbance	694	715	749	770	797	826	853	874	895	916	943	964	985	1,012	1,019	1,040	1,067	1,075	1,102	1,123	1,131
7. Acres Stabilized[4]	85	193	319	354	400	459	485	512	541	563	589	610	631	658	679	705	737	749	775	802	860
8. Net Long-Term Disturbance[5]	609	522	430	416	397	367	368	362	354	353	354	354	354	354	340	335	330	326	327	321	271
B. Maximum Future Projection[1]																					
Alternative B																					
1. Wells Drilled	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
2. Expected Producers[2]	3	5	8	10	13	15	18	20	23	25	28	30	33	35	38	40	43	45	48	50	53
3. Expected D&A	1	3	4	6	7	9	10	12	13	15	16	18	19	21	22	24	25	27	28	30	31
4. Abandoned Producers[3]	2	8	15	17	19	20	21	23	24	25	27	28	30	33	34	36	38	48	58	72	76
5. Total Producers (72 as of 12/89)	73	69	65	65	66	67	69	69	71	72	73	74	75	74	76	76	77	69	62	50	49
6. Acres of Surface Disurbance	707	749	797	839	887	929	977	1,019	1,067	1,109	1,157	1,199	1,247	1,289	1,337	1,379	1,427	1,469	1,477	1,519	1,567
7. Acres Stabilized[4]	85	193	319	362	424	492	533	577	614	652	694	732	769	812	849	892	939	977	1,019	1,062	1,144
8. Net Long-Term Disturbance[5]	622	556	478	477	463	437	444	442	453	457	463	467	478	477	488	487	488	492	458	457	423

[1] Cumulative Totals

[2] Success Ratio = 0.63

[3] Gas Well Productive Life = 20 Years; Oil Well Productive Life = 50 Years

[4] Assume 3-Year Stabilization

[5] Row 8 = Row 6 - Row 7

TABLE 4-28

COALBED METHANE PROJECTED DRILLING ACTIVITY (1990-2000) AND ASSOCIATED SURFACE DISTRUBANCE GREEN RIVER RESOURCE AREA (Alternatives A and B)

A. Minimum Future Projection[1]	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
1. Wells	11	21	31	37	37	37	37	37	37	37	37
2. Expected Producers[2]	2	3	5	6	6	6	6	6	6	6	6
3. Expected D&A	9	18	26	31	31	31	31	31	31	31	31
4. First Production[3]	0	0	2	3	5	6	6	6	6	6	6
5. Acres of Surface Disturbance	98	182	272	325	325	325	325	325	325	325	325
6. Acres Stablized[4]	0	0	0	87	165	244	292	292	292	292	292
7. Net Long-Term Disturbance[5]	98	182	272	238	160	81	33	33	33	33	33
B. Most Probable Future Projection[1]											
Alternatives A and B											
1. Wells Drilled	11	46	116	216	266	272	278	284	290	295	300
2. Expected Producers[6]	9	37	93	173	213	218	222	227	232	236	240
3. Expected D&A	2	9	23	43	53	54	56	57	58	59	60
4. First Production[3]	0	0	9	37	93	173	213	218	222	227	232
5. Acres of Surface Disturbance	140	581	1463	2723	3353	3430	3500	3577	3646	3717	3780
6. Acres Stabilized[4]	0	0	0	90	377	951	1771	2181	2231	2279	2329
7. Net Long-Term Disturbance[5]	140	581	1463	2633	2976	2479	1729	1396	1415	1438	1451

[1] Cummulative Totals

[2] Success Ratio = 0.15

[3] 2 Years Between Completion and First Production

[4] Assume 3-Year Stabilization

[5] Row 7 = Row 5 - Row 6

[6] Success Ratio = 0.80

Wild Horses

No new water developments would be constructed for wild horse herd area management.

Impact Analysis

Air Quality

There are no air quality regulations which the Bureau of Land Management is directly responsible for enforcing. The State of Wyoming Department of Environmental Quality is the agency with which the BLM must coordinate in air resource management. The Wyoming DEQ was delegated enforcement authority within the state by the federal Environmental Protection Agency. However, the National Environmental Policy Act and the Federal Land Management and Policy Act state that Federal land management agencies must not either directly or indirectly contribute to exceedances of pollution control regulation. The BLM engages in a number of activities which ultimately have an impact on air quality. In developing a management plan for other resources over which the agency has direct control, it is important that concern is maintained for resources such as air quality for which the BLM is not the primary control agency. Table 4-22 lists a number of the activities managed by the Bureau which have an influence on air quality. As an aid in comparing the magnitude of the air quality impact of each of these activities, typical emission factors are also listed. Another component of the magnitude of the impact of various activities on air quality is how widespread or large the activity is.

To manage the air resource of the Green River planning area, a technique is required which would enable the resource managers to estimate impacts of current and potential new sources without detailed pollutant emission and dispersion meteorology information. One technique for accomplishing this goal which has been used by the BLM previously is pollution potential mapping using the Topographic Air Pollution Analysis System (TAPAS). This produces a map based on the effect of terrain in channelling or stagnating wind flow to enhance or reduce pollution dispersion, which shows areas where chronic poor dispersion would make it undesirable to site a new development with the potential to produce significant air pollution emissions.

A simple version of such an analysis was performed for the entire planning area. Elevation contours of the area of this analysis are shown in Map 57. For this area, the TAPAS two-dimensional Winds model was used to simulate flow over the area for the most prominent wind speed and direction combinations as presented in the Rock Springs wind rose in Figure 4 which total more than 90 percent of the observations. Examples of the results from using the WINDS model are presented in Map 80 and Map 81 for NW winds at 2 m/s (4.5 mph) and SW winds at 2 m/s (4.5 mph), respectively. These maps show wind vector arrows which indicate the direction of the wind flow and by their length the wind speed for each location simulated by the model. The pollution potential values for each wind speed/direction combination are then weighted by the frequency of the winds for that combination from the wind rose. These weighted pollution potentials are then added to obtain the climatological pollution potential. This climatological pollution potential, thus, represents the long-term tendency of an area to stagnate or disperse pollutants. Pollution potential values less than 100 are generally considered low, those above 300 are considered high, and between these two values is considered moderate.

As can be seen from the final climatological pollution potential map presented in Map 79, the entire planning area has a median pollution risk. However, some small areas are near the borderline of the high risk category, (and the BLM would require further site specific analyses before permitting any activities in those areas). For instance, there is a point near the town of Green River where the pollution potential reaches 144, nearing the high potential category.

It is likely that visibility would continue to be degraded, however the rate of this degradation seems to be very slow and difficult to quantify. It is unlikely, however, for the air quality to exceed any standards in the long term.

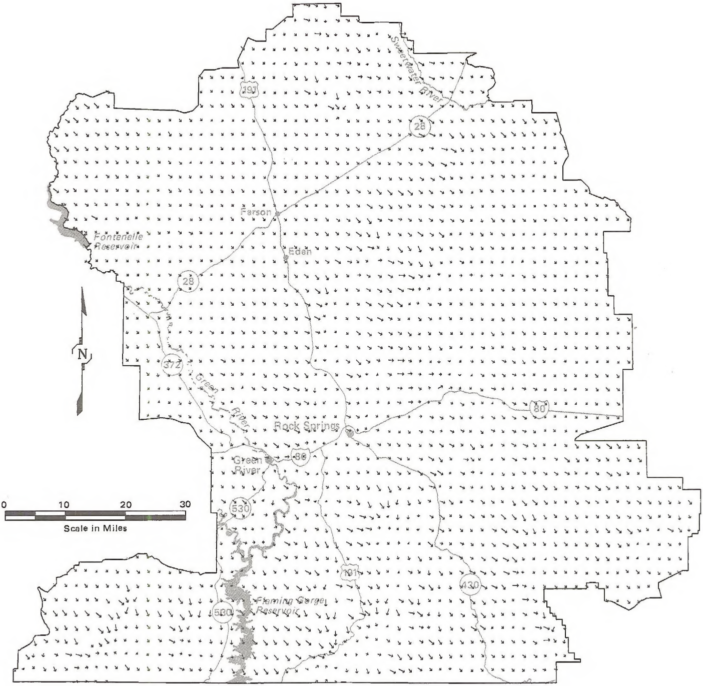
Summary

Adverse impacts to users could occur because of restricted location for placement of facilities.

Surface mining, construction activity, road use, facility emissions, prescribed fire, and wildfire affect air quality. Individual fires and construction activities have a short-term affect. Industrial emissions, dust from continued road use and surface mining, and vehicle emissions would be anticipated to occur over the long term. No irreversible or irretrievable impacts would be expected.

Candidate Plant Species

Factors that adversely affect air quality (e.g., emissions from industrial sites, airborne particles, etc.) may also affect candidate plant species especially if facilities are located near or adjacent to actual and potential plant locations. Because the candidate plants are located in fairly remote areas, dust impacts associated with roads are not expected to be significant.

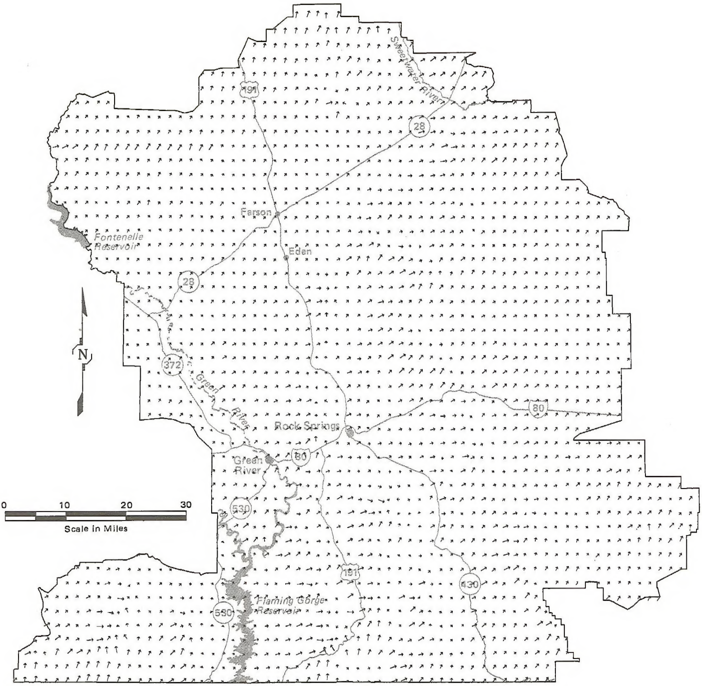


→ Maximum Vector (.562E+01)

Map 80

Vector Map Influencing Wind NW at 2 m/s

Green River Planning Area



→ Maximum Vector (.608E+01)

Map 81
Vector Map Influencing Wind SW at 2 m/s
Green River Planning Area

Generally, stipulations and management actions associated with cultural and paleontological resource management benefit and protect candidate plant locations and potential habitat. Management actions imposed to protect cultural values would benefit and protect precocious milkvetch locations and potential habitat.

Limitations imposed within the visual horizon of designated and nondesignated historic roads and trails would benefit and protect candidate plant locations and potential habitats.

Management activities implemented on commercial, noncommercial, and woodland forests would have no impact to candidate plants or potential habitats.

Closure, reclamation, or expansion of two illegal dumps (near McKinnon) on public lands could remove or otherwise impact existing precocious milkvetch populations and potential habitat.

Identified land disposal would have no impact on candidate plant existing populations or potential habitat. Not acquiring 1,900 acres of tansy mustard (*Descurainia torulosa*) habitat would not provide the beneficial affect to existing plant populations and potential habitat from application of management restrictions. Management of xisting plant locations as right-of-way avoidance areas and potential habitat areas as candidate plant survey areas would ensure no damage or impact to candidate plant populations. All other realty/lands actions involved with access and transportation, land ownership adjustments, and utility/transportation systems would have no impact to candidate plant locations or potential habitat.

Management prescriptions, including no surface occupancy stipulations in actual candidate plant locations would prevent impact to candidate plants from range improvement projects such as wells, reservoirs, and fences. Salting stations or other apparatus used to concentrate livestock activity could damage or remove any of the candidate plants. With present livestock numbers, there seems to be very little, if any, impact to candidate plant locations or potential habitat from livestock grazing. Meadow pussytoes (*Antennaria arcuata*) actually seems to thrive in grazed meadows, although the association between population densities and livestock grazing is not fully understood.

While most candidate plant locations and potential habitat areas are not susceptible to fire, actions implemented to confine, control, or contain (e.g., fireline construction and vehicle operations) could damage or remove actual plants or entire communities. Such activities can also severely damage potential habitat. Fire can also damage the plants/communities and may alter the site to promote other plant species.

If riparian areas, specifically wet meadows in the South Pass area, are improved and livestock are distributed to upland areas, range condition in potential habitat and existing locations of meadow pussytoes may improve and thereby eliminate existing populations of meadow pussytoes. Improved range condition may be detrimental to the existing populations of meadow pussytoes.

Conversions from cattle to sheep could alter grazing patterns and forage preference. Candidate plant locations and potential habitat could be impacted by such management actions.

Chemical control of noxious weeds could impact candidate plants. Control of thistle in the wet meadows around South Pass could remove or severely alter existing populations of meadow pussytoes.

Management of geophysical activities to avoid actual candidate plant sites would prevent existing populations from being impacted. The potential spread of populations could be impacted if geophysical activities occur on potential habitat. Dust from geophysical activities could land on candidate plants and limit photosynthetic processes. However, the adverse effects from dust disposition are expected to be negligible.

No leasing or no surface occupancy in actual plant locations and search and avoidance measures on potential candidate plant locations should prevent candidate plant populations from impact and habitat alteration due to oil and gas activity. Closure of potential habitat and existing locations to mineral material sales would prevent candidate plant impact and habitat degradation.

Actual candidate plant locations are closed to ORV activity. Off-road vehicle use in potential habitat areas is limited to existing roads and trails; therefore, in theory, there is currently no impact to existing populations. But, unauthorized off-road vehicle use does occur and could impact current populations and potential habitat.

Currently, no impact to candidate plants exists due to recreational activities. Additional recreational use in the Pine Creek exclosure could impact small rockcress (*Arabis pusilla*) and increased use on Quaking Aspen Mountain could affect *Descurainia torulosa*.

Prescribed burns could damage or eliminate existing candidate plant populations and impact potential habitat.

Trampling by wild horses has been listed as a threat to existing populations of large fruited bladderpod (*Lesquerella macrocarpa*); however, actual impacts appear to be minimal. Under current management of wild horses, there are no other known impacts to existing populations or potential habitat.

Management actions currently in place to protect visual quality, special management areas, watershed values, wilderness areas, wild and scenic rivers, and wildlife habitat generally benefit or do not impact candidate plant populations.

Mining operations on existing claims in actual plant locations or on potential habitat could severely damage or destroy existing plant communities as well as remove potential habitat.

Summary

Activities such as wildfire and related suppression activities, salting or areas where livestock concentrate, chemical control of noxious weeds, geophysical activity in potential habitat areas, off-road vehicle use, increased recreation use, trampling by wild horses, closure or expansion of the McKinnon dump, and conversions of sheep to cattle all contribute to an irreversible irretrievable loss of the plant populations. Mining claim activity and unauthorized uses could create an unavoidable adverse impact and could result in an irretrievable loss of plant populations and habitat.

Cultural, Natural History, and Paleontological

The impacts described for these resources would not generally be significant if the steps outlined in the Assumptions and Analysis Guidelines are followed.

Site specific cultural resource management plans on 15 trails (800 miles) and 12 sites would benefit cultural resources by targeting management and available budget.

Construction of well locations, pipelines, and access roads could destroy approximately 70 sites and destroy the integrity of an undetermined number of miles of historic trails.

Opening new coal mining operations in Deadman Wash and Beans Spring would impact cultural resources. Site density is likely to be twice the average density, or 7 to 8 sites per section in the Deadman Wash area. Beans Spring has been less than the average.

Occasionally, watershed and cultural resources may both be at risk in the development of facilities such as oil and gas wells, pipelines, or access roads. At times, it may be impossible to avoid a significant cultural resource without placing a facility in a location that would be detrimental to watershed. This impact could be significant; however, it is anticipated such situations would occur rarely, and fewer than 10 sites would be affected over the next 20 years.

Development actions in the Little Colorado Desert, North Nitchie Gulch, and Wamsutter Arch areas would continue to be protected by applying Section 106 compliance procedures.

Not managing geologic and ecologic values of Steamboat Mountain and Boar's Tusk-Killpecker Sand Dunes could allow deterioration of their value as sites of spiritual significance identified by Native American groups.

Construction of linear rights-of-way could destroy approximately 78 sites.

Land disposal could allow approximately 30 sites to pass into ownership where management to NHPA standards is not required. Retention of 992 acres of cultural withdrawals and the addition of 160 acres of withdrawals would protect specific cultural values. Fort LaClede would be acquired and protected.

Approximately 20 historic properties could be destroyed by development of coalbed methane in the Steamboat Mountain, Boar's Tusk, and North Table Mountain area.

Strip mining and construction of surface support facilities could result in impacts to approximately 120 historic sites.

Although only 61 acres of surface disturbance is projected in playa lake areas, the areas where development is proposed includes a playa lake-sand dune complex of known high site density. It is estimated that 12 significant sites could be destroyed in their natural setting.

Retention of the oil shale withdrawal would not allow zeolite mining and associated impacts to occur.

ORV closure or limitation to designated roads and trails on approximately 462,000 acres would lessen potential impacts to historic properties by lowering the potential for vehicular damage and unauthorized activities such as vandalism and looting. Closing 28,602 acres to geophysical vehicles and explosive charges would protect significant cultural sites and areas from destruction and associated erosion. Ten sites would be left unprotected and subject to destruction from vibration. The White Mountain, Sugarloaf, Tolar, Cedar Canyon, and LaBarge Bluff petroglyph sites are five of the most important historic properties in the planning area. The rock art at these sites is on very fragile stone surfaces which could be broken by the vibration caused either by explosive or vibroseis operations. Also, Dug Springs and LaClede Stage Stations are dry laid, stone masonry structures that could easily be collapsed by driving a vehicle near them.

Although not managed for wild and scenic river values, management of these areas through restrictions in floodplains, riparian areas, etc. would provide similar beneficial effects to cultural management.

Summary

Potential impacts to approximately 206 cultural resource sites would result from surface disturbing activities. Destruction of sites could result from scientific research and from data recovery mitigation efforts. If sites are not avoided, an irretrievable loss of the resource would occur. While data recovery enhances our knowledge, it also destroys the resource. Targeted management efforts within cultural resource management plans would benefit and enhance cultural resources.

Information gained from research on archeological resources would provide valuable insight into past climates and human use of resources which could improve management of public lands.

Other actions providing long-term benefits to cultural management would be; acquisition of Fort LaClede, 1,052 acres of withdrawals, management of 2,500 acres for Class II visual values around significant rock art sites, closure or limitation of areas for off-road vehicle use, and closure of 28,602 acres to geophysical vehicles and explosive charges. Ten sites would be left unprotected and subject to destruction from vibration.

Continued management of Steamboat Mountain and Boar's Tusk-Killpecker Sand Dunes could allow deterioration of their value to Native Americans.

Fire

Fire management activities associated with both wildfire and prescribed burns would create or provide a variety of benefits and impacts for numerous resources. Examples of benefits would include increased forage for livestock, wild horses, and wildlife. Examples of impacts would include cultural sites or candidate plant damaged or destroyed through fire line construction and/or vehicle operations, the loss of cultural rock art through the application of dye-impregnated fire retardant, the loss of sage grouse strutting habitat, the loss of soil stabilizing vegetative cover on unstable/erosive soils, or the damage or destruction of human-made facilities, such as fences, oil and gas wells and pipelines, and campgrounds. Refer to the other resource sections in this chapter for additional fire related impacts.

The primary impact to the fire management program would be increased prescribed burn and wildfire suppression costs. Increased costs would result from increased fire frequency, increased fire size and/or intensity, and increased costs of doing business.

Factors affecting fire frequency are off-road vehicle use, recreational activity, mineral exploration and development, and firewood/timber cutting.

Off-road vehicle use frequently occurs in remote, difficult to access areas. While the ORV trails do provide access to those remote areas, the time required to get fire suppression equipment to them is considerable. Off-road vehicle use contributes to wildfire activity in two ways: 1) escaped camp fires, and 2) fires ignited from the off-road vehicle (i.e., the catalytic convertor).

Recreational activity (i.e., camping, picnicking, hunting, fishing, backpacking) also frequently occur in remote, difficult to access areas. Wildfire activity from recreational activity occurs the same as off-road vehicle use.

The designation of special recreation management areas would invite more public use and would increase the probability of wildfire occurrences.

Mineral exploration, development, and production add to potential of wildlife occurrence through an increased number of ignition sources, i.e., catalytic convertors on geophysical exploration, as well as other mineral development vehicles; surface explosives for geophysical exploration; welding equipment and operations; sparks from heavy equipment operations, etc.

Firewood/timber cutting contributes to wildfire activity through escaped campfires, vehicle operations (catalytic convertors), and sparks from chainsaws or other logging equipment. While logging operations frequently create openings that eventually become fire or fire breaks, the initial increase in logging debris or slash would result in more intense and difficult to control fires.

Factors affecting fire size and/or intensity are restrictions on equipment use and activities that increase or decrease fuel loading. For example, the use of fire suppression vehicles are restricted to existing roads and trails in known cultural resource sites and on 3,110 acres containing candidate plants and known plant habitat. Also, the use of dye-impregnated fire retardants, phosphate water extenders, and other suppression equipment is restricted in several special management areas. Fire intensity due to increased or decreased fuel loading are attributable to livestock grazing and timber harvesting. Livestock grazing generally reduces the amount of fine fuels which decrease fire intensity. However, excessive removal of fine fuels can result in increased brush production which would increase fire intensity. The affects of timber harvesting were discussed above.

Factors affecting the cost of doing business are an increased frequency of unauthorized hazardous material sites and the increase of the number of wildland/industrial and wildland/urban interface areas.

Hazardous material areas present a serious health hazard to fire fighters who come in contact with them. To promote safety, additional training and specialized equipment may be needed.

As the number of wildland/industrial and wildland/urban interface areas increase, so does the demand for fire protection and the expectancy for immediate response. While protection of urban and industrial areas typically fall under city and/or county jurisdiction, the BLM may be forced to increase the number of firefighters to protect both the human-made facilities and the adjacent public land. An increase in damage suits from escaped or uncontrolled wildfires can be expected.

Factors affecting prescribed burn costs are restrictions on the use of vehicles or other equipment, establishing or constructing black lines or control lines around sensitive resource value areas such as cultural resource or candidate plant sites, and requirements to burn some sensitive watersheds in the spring. Spring burning requires roughly twice as much fine fuels as fall burning.

Summary

Short- and long-term impacts could occur from additional costs for wildfire suppression and prescribed fire, accrued from restrictions imposed by other resource management requirements.

Forestry

Implementation of this alternative would result in all commercial and noncommercial forest lands in the planning area being placed in a restricted management category. The noncommercial lands would be managed to protect watershed and soil values and to optimize wildlife cover. The commercial forest lands would be managed to improve the health and vigor of the various stands but to still maintain or enhance wildlife, watershed, and recreational values. The projected annual sales quantity for this alternative would vary from 500,000 to 1,000,000 feet. An annual sales quantity of 500,000 board feet would equate to a 55 percent reduction from maximum potential output (1985 annual sales quantity computations for the Rock Springs District), while an output level of 1 million board feet would only equate to a 1 percent reduction. In addition to the proposed reductions in annual timber sale quantities from the commercial fores lands, Alternative A would also place a variety of operational and seasonal restrictions on the use of those lands.

Operational Restrictions

No surface disturbance would be allowed on 247 acres of commercial forest lands that occur within 500 feet of live water, floodplains, and/or riparian/wetland areas.

Clearcuts would be limited to 25 acres in size.

Seasonal Restrictions

Logging and fuelwood gathering would not be allowed on 1,436 acres of commercial forest land that falls within big game winter ranges from November 15 through April 30, on 2,662 acres of commercial forest land that fall within big game parturition habitat from May 1 through June 30, and 22 acres of commercial forest land that fall within restriction habitats surrounding raptor nests and sage grouse leks from February 1 through July 31. In total, the operational and seasonal restrictions would be applied to 4,367 acres or roughly 55 percent of the commercial forest land.

The management actions that would occur in the noncommercial forest land would be specifically designed to maintain or enhance wildlife, watershed, and recreation values hence no operational or seasonal restrictions were placed on those acres. However, such restrictions may be placed on individual projects.

Summary

The reduced quantity of timber volume available for harvesting combined with operational and seasonal restrictions on 4,367 acres would: 1) decrease the amount of raw material (i.e., logs) available to lumber/wood product producers, 2) decrease the timber sale receipts/revenue returned to the government, and 3) potentially lead to increased insect and disease levels. The amount of adverse affect on the forest resources would depend on the actual harvest. At an annual sales quantity of 1,000,000 feet, the effect would be minimal. However, at an annual sales quantity of 500,000 board feet the potential timber sales receipts and potential amount of material available to producers from the commercial forest lands in the planning area would be reduced by roughly 55 percent.

Hazardous Materials

The impacts would be the same as the Preferred Alternative. Hazardous waste spills and unauthorized dumping on the public lands would be immediately cleaned up by BLM or the responsible party to reduce resource impacts. Lands would be inspected prior to transfer out of public ownership or prior to acquisition to protect the public from contact with hazardous materials.

Water resources would be protected by testing produced water pits or drilling fluid pits if they show indications of containing hazardous wastes.

Lands and Realty

Public land users would be impacted by 168,410 acres set aside for avoidance, exclusion and no surface occupancy, and 2,393,030 acres with seasonal restrictions due to recreation, cultural, visual, wildlife, and other resource values. Approximately 45 percent of all rights-of-way would be impacted by these decisions (Table 2-4; Table 2-5; and Table 2-21).

The majority of the exclusion areas are the 10- to 20-acre petroglyph sites and there would be no impact on rights-of-way, the large acreages of exclusion within the Sweetwater River wild and scenic river corridor and the Currant and Red Creek drainages under the Preferred Alternative would not occur providing benefits to the location of rights-of-way.

Avoidance areas would have a small impact on rights-of-way except for those large areas within the Greater Sand Dunes ACEC (38,650 acres), South Pass Historic Landscape (87,580 acres), and the Red Creek ACEC (55,880 acres). To avoid these areas would require major reroutes. The proposed Steamboat Mountain ACEC and Tri-State ACEC would not be implemented under this alternative.

Although there is not much activity in the South Pass Historic Landscape or Greater Sand Dunes ACEC, any proposal to place facilities in these general areas may require major reroutes and extensive planning to limit impact to the resource values.

A total of 3,270 acres of actual candidate plant sites (including 160 acres on Pine Buttes) would be exclusion areas for rights-of-way. These small sites would not have an impact on right-of-way location. Candidate plant sites would be withdrawn which would preclude disposal or entry. On 38,600 acres of candidate plant habitat, an inventory would be required prior to construction which would impact the timing of construction of rights-of-way as these inventories can occur only at certain times of the year.

Seasonal restrictions and other mitigation measures to protect resource values and threatened and endangered species (T&E) would impact rights-of-way. Approximately 50 rights-of-way may have to be rerouted or mitigated annually to protect cultural/historical, wildlife, and T&E values. Crucial wildlife habitat would impact the location or timing of rights-of-way construction. Wetland/riparian areas and floodplains also would impact the location of rights-of-way.

The possibility of high dust levels resulting from use of unpaved access roads would necessitate stipulations to control dust. All construction rights-of-way as well as access road rights-of-way would include a stipulation requiring that the holder meet Federal and State air quality standards.

Land tenure adjustments would occur only if the benefits outweigh any adverse impacts, and if there are no significant impacts which cannot be mitigated. A total of 9,123 acres have been identified as possibly suitable for disposal (Appendix 8-1). The ability to sell/exchange land and to issue Recreation and Public Purpose Leases and patents would benefit communities and industry. The sale or exchange of isolated tracts would result in the disposal of lands that are difficult to manage. Based upon past experience, it is anticipated that 3,000 acres would be sold, exchanged, or patented under the Recreation and Public Purposes Act over the next 20 years. Sale or exchange of lands may be necessary to accommodate the need for hazardous material or solid waste disposal sites. All lands must have a hazardous waste clearance prior to disposal which would increase the cost to the proponent or to the Bureau.

Existing withdrawals would be retained (Table 2-7). The majority of the planning area would remain closed to mineral location and disposal. Disposal of lands within the oil shale withdrawal would require partial revocation of that withdrawal which adds an additional 3 to 6 months processing time. Coal could not be transferred within the coal withdrawal. Retention of the withdrawals serves to protect resource values in addition to those values for which the lands were withdrawn.

The withdrawal of 34,859 acres of lands within ACECs and other special management areas would preclude disposal, entry, and mineral location (Table 2-6).

As part of the federal program to reduce the salinity and sedimentation of the Green River Basin, desert land entries or agricultural leases would be authorized only if such use meets the soils/water and Department of Agriculture criteria. This would have slight impact as little of the planning area meets the criteria for desert entry.

The acquisition of access would be required to protect and promote resource values (ACECs, recreation, timber and mineral sales, access to BLM improvements, etc.) (Table 2-8).

Summary

The majority of rights-of-way require short-term use of lands, and long-term productivity is restored upon rehabilitation. Unavoidable adverse impacts could occur to rights-of-way management because of constraints for resource protection that impact the routes selected and the timing of construction. The greatest impact would be in those areas which would be managed as no surface occupancy areas and are listed as avoidance or exclusion areas for rights-of-way.

Those lands which remain withdrawn continue to be unavailable for mineral entry, causing a long-term loss of productivity of locatable mineral resources on about 3 million acres.

Lands would be irreversibly lost to the public land base when sold or exchanged (about 9,100 acres). Under exchange, however, lands of comparable value would be obtained. Lands currently authorized as landfill sites or industrial ponds would be irretrievably committed to compatible uses. For example, landfill sites are susceptible to subsidence and methane gas leakage; therefore, any later construction must take these potential problems into account. Railroad rights-of-way or any rights-of-way requiring large amounts of earthwork may be irretrievable due to cost and complexity of rehabilitation.

Livestock Grazing

Surface disturbing activities would continue to cause minor impacts to livestock grazing management. These impacts are generally expressed as forage or AUMs lost or not available. To date, 3,346 AUMs have been lost due to surface disturbing activities.

All previous land actions involving sales or exchanges have resulted in reduction of AUMs to permittees.

In this alternative, there would be 9 AMPs developed and implemented for "I" category allotments. There are short-term impacts that would continue to occur pending completion of these AMPs. Localized overutilization of vegetation would continue to occur in riparian areas. There could also be long-term impacts due to decreases in forage and an overall decline in ecological condition if decisions are not implemented. In the short term, distribution problems would continue to cause localized overutilization of forage in upland areas.

Presently, there are no impacts to livestock grazing from Air Quality, Recreation, or Forest management.

Brush treatment has been proposed for 26,700 acres. A short-term loss of acreage and AUMs would occur in some allotments due to removal of vegetation and required rest of 2 growing seasons from livestock grazing. This action may necessitate modifications to grazing systems and temporary livestock reductions. Long-term benefits to livestock could be expected due to increases in forage quality and quantity. Rangeland improvement projects would remove 77 acres (6 AUMs) from long-term production.

Avoidance of significant cultural sites, limitations on activities within ¼ mile of historic trails, and subordination of activities to historic landscape values in some areas would continue to constrain the BLM's ability to construct rangeland improvements aimed at achieving better distribution and management of livestock. Added survey and design costs could be necessary to avoid effects to cultural resources.

A land exchange within the boundaries of the Fourth of July allotment should not cause any adverse impacts. The proposed exchange in this checkerboard allotment would block up public and private land and facilitate better livestock management.

Long-term benefits would occur for completion and implementation of 42 AMPs on about 60 percent of the planning area.

There are 9 allotments encompassing 384,000 acres that could be affected by surface disturbance primarily oil and gas development and geophysical exploration, during the lambing period of May 1 to June 15. This disturbance could possibly cause a disruption of lambing which could cause death or bumming of the new born lambs. The nine allotments are Lombard, Highway Gasson, Big Sandy, Sublette, Boundary, Poston, Reservoir, Prospect Mountain, and Little Prospect.

No impact to livestock grazing is expected from surface disturbance stipulations for 3,110 acres of known candidate plant locations. However, limitations on activities in potential habitat areas (36,550 acres) could restrict the BLM's ability to construct rangeland improvements aimed at achieving better distribution management of livestock and objectives set in AMPs may not be met.

BLM participation in the Wyoming Weed and Pest Program would result in moderately beneficial impacts to the livestock management program by removing undesirable weeds and encouraging growth of desirable vegetation.

There could be impacts to livestock grazing management due to current wildlife numbers in the Sublette antelope winter range, and the Tri-State elk herd area. In the Sublette antelope winter range the strategic plan objective is 19,600 antelope and the 1990 post-season counts showed 33,000 antelope. The strategic plan objective for the Tri-State elk area is 800 animals and the 1990 post-season count showed 1,000 elk. The current numbers of wildlife in these two areas could contribute to overuse of the vegetation. There are several reasons why impacts are not more apparent, including less than normal severity of winters and large amounts of nonuse taken by grazing permittees over the past 5 years.

Some off-road vehicle users would continue to harass livestock and leave gates open.

Currently, 16,200 AUMs of forage for 1,350 wild horses in four Wild Horse Management Areas is being reserved in associated allotments. Current rangeland monitoring has not detected severe impacts. However, monitoring has identified certain areas where concentrations of horses are causing localized overutilization of forage.

The six developed and five undeveloped recreation sites would cause little disturbance or impact to management livestock grazing.

In this alternative, Wild and Scenic River management could cause an impact to livestock grazing due to the restriction of increasing existing AUMs or issuing new grazing permits.

Existing lands, minerals, wild horse, range, and wildlife actions have removed roughly 3,346 AUMs of livestock forage from surface disturbing activities. Management actions proposed for the next 20 years would remove forage from an additional 50,134 cres. In total, forage production would be affected on 90,552 acres. During the next 20 years, an estimated 41,306 acres would be reclaimed. After reclamation, roughly 49,246 acres would still be out of forage production. The forage loss associated with the unreclaimed lands would be approximately 4,109 AUMs. Table 4-29 shows the expected losses by disturbance category.

Riparian habitat would continue to benefit under this alternative. The growing emphasis to improve this habitat is demonstrated by the initiative to improve 75 percent of the riparian habitat to proper functioning condition by 1997.

There are no impacts to livestock grazing management due to management actions described for the White Mountain Petroglyphs ACEC. This ACEC lies within the Sands Allotment and protection of this site would not interfere with the operation of the grazing system described in the AMP.

Wild horse traps and water developments would affect approximately 45 acres (4 AUMs).

There would be no known impacts to livestock grazing management due to actions described for the Pine Springs ACEC. This ACEC lies within the Henrys Fork Allotment and protection of this area would not interfere with the operation of the grazing system described in the AMP.

There are no known impacts or conflicts with the management actions described for the Natural Corrals and Cedar Canyon ACECs. These ACECs lie within the Rock Spring Allotment which is in an "M" category.

An impact to livestock grazing management could arise due to the 50 percent utilization level in the Greater Sand Dunes ACEC. This level is not a current objective of the Sands AMP or the Rock Springs Allotment. The Sand Dunes AMP would have to be modified to support this action. Utilization levels would have to be imposed in the sand dunes area of the Rock Springs Allotment.

There would be no known impacts or conflicts to livestock grazing management due to actions described for the Red Creek ACEC.

There are no known impacts or conflicts with the management actions described for the Oregon Buttes ACEC. This ACEC lies within the Bush Rim allotment which is in an "M" category and has no proposed range improvement projects.

TABLE 4-29

LIVESTOCK FORAGE/AUM LOSSES (ALTERNATIVE A)

Activity	Existing Disturbed Acres	Projected Disturbed Acres	Total Disturbed Acres	Reclaimed Acres	Net Disturbed Acres	AUMs Lost
Lands Actions						
Disposal	2,783	9,123	11,906	NA	11,906	992
Authorizations (R/Ws, permits, leases)	8,325[1]	8,325	16,650	6,500	10,150	846
Wild Horse						
Trap sites	62	30	92	0	92	8
Water development	0	15	15	0	15	1
Range Improvements						
Wells, pits, reservoirs	810	77	887	0	887	74
Wildlife						
Guzzlers	10	0	10	0	10	4
Exclosures	930	970	1,900	0	1,900	160
Mineral						
Oil and gas	10,435	14,194	24,629	14,537	10,092	841
Gravel pits	1,080[2]	—	1,080	—	1,080	90
Coalbed methane	140	3,640	3,780	2,329	1,451	121
Coal (6 mines)	13,918	13,640	27,558	17,940	9,618	802
Mine Sites (trona, jadeite, zeolite, gold)	1,920	120	2,040	0	2,040	170
Sodium wells	5	0	5	0	5	<1
Total	**40,418**	**50,134**	**90,552**	**41,306**	**49,246**	**4,109**

[1] Based on Resource Area estimates. Actual disturbance due to lands actions is not presently known (Haverly).

[2] Based on Resource Area estimates. Actual acreage of gravel pits is not known. It is estimated that the amount of disturbance will remain constant (i.e., new acres disturbed would be offset by acres reclaimed) (Porter).

No surface occupancy stipulations in the Currant Creek special management area (23,740 acres) would limit rangeland project construction and could prevent improved livestock distribution patterns.

There would be no conflicts or impacts to livestock grazing management with proposed and current management actions in the Monument Valley area.

Summary

Prescribed burning on 26,000 acres and wildfire would have a short-term impact on forage but should result in long-term productivity of forage.

Currently, 2,890 AUMs are removed from production. Projected losses would affect another 1,104 AUMs due to range and wildlife improvements, lands and realty actions, and mineral developments removing forage for long periods of time.

No surface occupancy requirements affect project placement and development aimed at improving livestock distribution. This would have a long-term affect, and livestock distribution problems would continue for both the short term and long term.

Surface disturbance on 9 allotments (384,000 acres) could disrupt lambing. Land disposals would be considered an irreversible irretrievable loss of forage.

Minerals

Oil and Gas

Selective requirements on some projects would increase costs and cause potential project siting problems.

Table 2-21 shows acres of ownership and development potential for each of the three types of lease restriction. The application of a no leasing restriction would remove 264,770 acres from potential opportunities for the exploration and/or development of oil and gas resources. Approximately 169,890 of these acres have high development potential, while 19,630 acres have moderate potential and 80,080 acres have low development potential. This increases the impact of oil and gas activities and results in fewer wells being drilled than would otherwise occur.

The application of no surface occupancy stipulations would affect 61,570 acres of land with high development potential, while 39,760 acres of moderate potential and 79,140 acres of low potential would be affected. The effect of adding this stipulation to a lease would result in adding to the potential costs of drilling exploration and development wells by requiring relocation of well sites outside the restricted area and in some cases requiring the additional expense of pursuing directional drilling to access a reservoir. Also, in some parts of the planning area, the cost of drilling a directional well would be so high that wells would not be drilled because of economic considerations. In addition, the amount of land with a no surface occupancy stipulation, in some locations, would cover such a large area that companies would not have the technical ability to be able to drill wells to access areas in the middle.

The application of a seasonal restriction stipulation to leases would affect 1,086,070 acres of land with high development potential, while 667,140 acres of moderate potential and 714,790 acres of low potential would be affected. The effect of adding this stipulation to a lease would result in reducing the amount of time that exploration, development, and production activities can occur in each year. Activity would be concentrated into shorter time periods, increasing costs to those developing the resource.

A surface disturbance type of stipulation placed on each oil and gas lease issued in the listed area would affect 472,950 acres of land with high development potential, while 132,410 acres of moderate potential and 472,880 acres of low potential would be affected. The effect of adding this type of stipulation to leases results in increased costs of drilling to mitigate impacts or relocating to avoid the restriction. In some cases, the cost of mitigation would be so high that the development activity would no longer be economic to pursue.

In the planning area, an estimated 1,328 federal and private wells would be drilled during the 1991 through 2010 time period. Production from all wells in the planning area during this period would be 13,819,657 barrels of oil and 519,976,925,000 cubic feet of gas.

Restrictions in the area of high coalbed methane development potential would cause the same impacts as for oil and gas development.

The cost of geophysical activities would also be increased, with some activities being limited to certain times of the year or displaced from areas of conflict with other resource values. In some parts of the planning area, restrictions would limit the amount of seismic that can be performed so that complete analysis of the potential resource would not be available before drilling activity occurs.

Coal

If the projected coal mines are not allowed, royalty would be lost to the state, federal government, and the local area economy.

Impacts to the coal program occur from wildlife areas that are removed from mineral development or restrictions placed on mining operations such as no surface occupancy or mining limited to underground operations. Cultural resources would inhibit mining where significant prehistoric and historic sites and sites of religious or spiritual concern to Native Americans are identified; coal would be excluded from surface occupancy or surface mining, and underground mining would be excluded in some areas. Areas identified as candidate plant species would have no surface occupancy stipulations. Cost of mitigation in avoidance of these resource issues may leave coal unmined; thus, the coal resource is forever lost as it becomes uneconomic as an isolated coal zone.

Visual, air, and water resources impact coal development by increasing costs in mitigation. Wetland areas would be managed to enhance other resource values, also increasing coal development costs or leaving isolated unmined coal. These costs are passed on to consumers of the coal resource.

Surface coal mining is prohibited in WSAs and some ACECs. The coal resources within these areas would be lost to the nation's energy needs where subsurface mining is not feasible.

Sodium/Trona

Impacts to sodium would be from air, water, and visual resources. These resource objectives would often increase the cost of sodium development and may inhibit further development in the northern known sodium leasing area.

Locatable Minerals

Approximately 3 million acres of withdrawals would continue to remain in effect, and lands within them would continue to remain unavailable for mineral location. An additional 34,859 acres would be recommended for withdrawal from the mining laws, and lands within them would then be unavailable for location under the mining laws. The result would be that approximately 86 percent of the public lands in the planning area would be withdrawn. This could have a long-term adverse impact to exploration and development of these mineral resources.

Operations on any mining claims located in stock driveways would have to be managed in such a way as to avoid conflicts with cattle or sheep.

Approximately 88,000 acres within existing ACECs would require a Plan of Operations for any activities other than casual use. These lands may overlap the existing and proposed withdrawals listed in Table 2-7 and Table 2-6.

Under this alternative, 34,000 acres would be withdrawn from mineral location. The public lands within the South Pass Historic Landscape would be managed under the same policies as those public lands outside the Landscape. Impacts to locatable minerals exploration and development within the Landscape would be the same as that of similar areas outside the Landscape.

Approximately 52,700 acres of public lands would be closed to off-road vehicle use, and would have the same requirement for a Plan of Operations as that of an Area of Critical Environmental Concern (43 CFR 3809.1-4(b-5). Any locatable minerals activities other than casual use would require a Plan of Operations, reclamation bond, and environmental assessment.

Mineral Materials

Opportunities for sales would be lost on about 88,327 acres (see Table 2-13). This is a small portion of the planning area and should not significantly affect the availability of mineral materials area-wide.

Areas of no surface occupancy or seasonal restrictions are the same as those listed in Table 2-21. This table also lists areas where no surface disturbance would be allowed. These no surface occupancy and no surface disturbance areas would adversely impact the use of mineral materials. While mineral material sales may not be specifically prohibited in these areas, it would be impractical to remove mineral materials from an area without either disturbing or occupying the surface in the process. Mitigation measures would increase the costs of doing business, limit timing of activities, and may preclude some activities.

Surface disturbing activities (including mineral material sites) would not be allowed within ¼ mile of Expansion Era historic roads (approximately 800 miles) unless a site specific analysis determines that NRHP eligible segments would not be adversely affected. No surface disturbance (including mineral material sales) within the Cedar Canyon ACEC on areas with slopes exceeding 12 percent without an approved engineering design plan means that any mineral material sites within such areas would require an approved Plan prior to approval. Some materials may not be available for use in this area, but the amount would not be significant area-wide.

The disposal of mineral materials from existing sites (i.e., community pits and other disposal sites) would eventually result in the depletion of these sites, necessitating the establishment of new sites.

About 730 acres would be open to consideration of mineral material sales (along existing roads and trails) within the 5,300 acres of the Pine Springs Expansion Area.

Summary

Oil and Gas

Short-term and long-term affects would occur to mineral production and management by closing 255,560 acres to leasing. No surface occupancy requirements and restrictions on surface disturbance would increase the costs of doing business and possibly preclude some activities.

Approximately 520 billion cubic feet of gas and 13.8 million barrels of oil would be produced during the 1991 through 2010 time period. This production would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Coal

Short-term and long-term affects would occur to coal leasing and development due to 14,400 acres determined unsuitable for leasing, 4,408 acres unacceptable for surface and subsurface mining, 5,800 acres unacceptable for subsurface mining, and 7,168 acres limited for surface facilities. Increased costs of mitigation would have short- and long-term affects on coal production activities by increasing costs and limiting timing of development.

Approximately 324.85 million tons would be produced which would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Sodium/Trona

Long-term benefits would occur with the entire area being open to leasing. However, short- and long-term affects would occur through increased costs of mitigation.

Approximately 100 million tons of trona (see Appendix 10) would be produced from within the planning area, which would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Mineral Materials

Increased costs of mitigation (about 168,000 acres of no surface occupancy and 88,327 acres closed to salable minerals) would increase costs of doing business in both the short and long term. Some unauthorized use would continue. Materials sold would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Locatable Minerals

Existing withdrawals on approximately 3 million acres and new withdrawals on 34,859 acres would have both a short- and long-term adverse affect on the development of locatable minerals, as would the increased costs of mitigation. Additional requirements and mitigation for ACECs would increase costs of doing business for both short- and long-term periods.

Geophysical

Areas closed to geophysical activity would result in a loss of data through the long term, and would be considered an unavoidable adverse impact. Increased costs for mitigation would affect operations in both the short and long term. Areas open to vehicle use and exploration activity provide beneficial long-term affects because retrieval of information is allowed.

Off-Road Vehicles

Under Alternative A, off-road vehicle use in the Sand Dunes "open" area would be allowed on 10,500 acres. About 3,444,170 acres would be limited to existing roads and trails; 20 acres would be limited to designated roads and trails; 180,000 acres would closed to vehicle traffic; and 1,671,020 acres of existing and designated roads and trails would fall under seasonal closures (see Table 4-24). The areas closed and those limited to designated roads and trails particularly affect off-road vehicle travel and accessibility to areas. This results in a long-term adverse impact to users. However, this is offset by the large amount of open area and those areas limited to existing roads and trails.

Affects from ORV activity on wildlife have resulted in limitations, closures, and seasonal closures. ORV travel within big game winter ranges in general is limited to existing roads and trails. Seasonal closures to ORVs occur on big game winter ranges from November 15 to April 30 as needed, elk calving areas May 1 to June 30 as needed, deer parturition areas from May 1 to June 30 as needed, and the roads around Steamboat Mountain as needed, depending on the year. Full closures exist at Cedar Canyon and Natural Corrals ACECs. These constraints would mostly affect snowmobile users.

Many cultural sites have been closed or limited to off-road vehicle use, impacting this activity by displacing users in those areas.

Candidate plant areas, Natural Corrals ACEC, Oregon Buttes ACEC, Pine Springs ACEC, Pine Springs Expansion Area, and Red Creek ACEC are partially closed or closed completely to ORV travel, displacing users (see Table 2-23). This is less than 1 percent of the planning area and would not be considered a significant effect.

The 10,500-acre "open" area in the Greater Sand Dunes ACEC is the only ORV play area in the planning area and provides benefits to ORV users.

Sand and gravel pits and other mining sites attract some off-road vehicle use, especially 4-wheelers and motorcycles.

Rights-of-way, easements, etc., open areas to ORV activity, especially pipelines, oil and gas access roads, legal access into the sand dunes, etc. Acquisitions, especially if two-tracks exist, add to the amount of ORV areas to be used by enthusiasts.

New fences that cross two-tracks inhibit off-road vehicle use. Livestock trailing in the spring and fall impacts off-road vehicle users by forcing them to wait while the livestock cross.

In the Sand Dunes ORV Area, the oil and gas development has caused a severe safety factor to ORV users because of the installation of above and below ground appurtenances. Pipes that are installed below ground can be exposed six months later and be six feet in the air. Access routes for minerals exploration and development open up new areas for off-road vehicle use. A Recreation Management Plan would address the visitor health and safety concerns. Initial solutions include mapping hazardous sites and supplying these maps to the users. Pipelines would be flagged and abandoned pipelines would be removed.

These measures should reduce the amount of impact to users; however, some hazards would still exist.

Several areas in the planning area have a closed or limited ORV designation to protect visual concerns, including the steep slopes of White Mountain, the hills surrounding the town of Green River, and all other viewsheds in the planning area. This limits the areas available for off-road vehicle travel. However, the amount of acreage would be about 2 percent of public lands in the planning area.

Watershed values are protected by a closed or limited designation on the steep slopes of White Mountain, the Red Creek ACEC, and the Currant and Sage Creek area. Access to these areas would still exist, but in a limited amount.

All WSAs, except Adobe Town, would remain closed to off-road vehicle use except for specific work-related activities such as range, emergency, or grandfathered uses as specified in the document "Interim Management Policy and Guidelines for Lands Under Wilderness Review" (USDI 1987). This limits the area available for off-road vehicle travel on about 5 percent of the planning area.

Summary

Long-term beneficial impacts would result from the large amount of area available on existing roads and trails for off-road vehicle use, and 10,500 open acres. This would offset the affects from closures on about 180,000 acres or 5 percent of public lands in the planning area.

Recreation

Identification and protection of significant cultural sites and features would continue providing benefits of public viewing and interpretive site opportunities.

Forest management activities would have a slight adverse impact on recreation resources or values since recreation related impacts from forest management are tied to wildlife populations, primarily big game hunting. Impacts would be in the form of fewer hunter days as a result of a lower big game population levels.

Livestock grazing in undeveloped recreation sites would continue to cause increased loss of vegetation and soil, and increased sanitation and safety problems.

Some disruption of hunting use may occur in areas adjacent to oil and gas activity. Hunting use is tied to wildlife populations, which are protected by wildlife stipulations and mitigating measures. Some traditional hunting areas may change due to the displacement of wildlife from development activities.

Other recreation activities such as fishing, picnicking, hiking, wildlife viewing, cross-country skiing, and snowmobiling would be impacted by the disruption of the natural scene. Increased access created by mineral exploration and other activities would result in increased recreation use of the developed areas.

Recreation resources and values would benefit from surface disturbance restrictions within 500 feet of live water. This protects most of the developed recreation sites in the area. However, those sites that are not adjacent to water would not be adequately protected.

Off-road vehicle closures and limitations would continue to limit conflicts with wildlife and some of the recreation use conflicts; however, numerous conflict areas would still exist. The net impact to recreation would be adverse in that these conflicts would continue with no long-range direction for their reduction or management.

The improvement and protection of wildlife habitat would maintain or improve hunting opportunities.

Limiting large surface-disturbing activities and structures on or within ¼ mile of the Continental Snowmobile Trail would maintain the integrity of the trail.

The opportunity to showcase diverse resources would be lost by not considering backcountry byways.

Dispersed recreation activities such as hiking, picnicking, and hunting would continue to be allowed in Special Management Areas. Camping is generally allowed, although certain areas (i.e., riparian areas) may be closed to protect resource values.

The camping limit of 14 days within a 5-mile radius may inconvenience some users. The limit would help to maintain the quality of the planning area for recreation. Permitting camping in riparian areas and near crucial wildlife and livestock waters would allow users to continue to use traditional sites.

Special recreation permits and the accompanying mitigation would assure resource protection and public safety.

The recreation program would benefit from implementation of management plans for special recreation areas, Recreation Area Management Plans, recreation project plans, wild horse viewing areas, establishment of the Green River "greenbelt," and limitation of surface disturbance within ¼ mile of the Continental Divide Snowmobile Trail. No surface occupancy requirements on Boar's Tusk, Pilot Butte, Emmons Cone, and the 14-Mile recreation area would also benefit the recreation program.

Summary

Long-term impacts would occur to recreation users as recreation use increases but additional facilities are not available. Disruption of recreation opportunities in areas of development would occur both over the short and long term. This would be important to the local user but probably not nationally significant.

This alternative would have short-term beneficial impacts but potential long-term adverse impacts to the recreation resource. The objective of managing for existing use and preventing resource damage would solve many of the current problems but the long range needs of the public would not be met. As recreation use increases in the future, much of the potential of recreation resources would not be utilized, resulting in overuse of the existing areas.

Socioeconomics

Related socioeconomic tables are found in Appendix 10. Other economic tables, graphs, and charts which were used for the analysis in the document are on file at the BLM Green River Resource Area in Rock Springs, Wyoming.

Livestock

Impacts are the same as those addressed in the Preferred Alternative.

Recreation

Under this alternative, annual recreation days in the resource area are estimated to remain at base year levels over the next 20 years. Recreation days in the 1990 base year totaled about 77,317, valued at over $5.4 million in terms of direct user expenditures. See the Affected Environment, socioeconomic section of this document for more details on the base year situation. It is estimated that recreation activity in 1990 contributed over $11 million to total (direct, indirect, and induced) economic output. Over the 20 years of the plan, direct expenditures on recreation could total almost $108.53 million and could produce a cumulative benefit to total Area economic output of almost $223 million.

It is also estimated that 1990 direct recreation sector income was over $1.8 million, and that total area income (direct, indirect, and induced) was enhanced by almost

$2.8 million as the result of Area recreation. The cumulative benefit of recreation to total area income over 20 years is estimated at almost $56 million.

Direct employment by the recreation sector in 1990 is estimated to have been close to 209 FTE employees. However, total Area employment related to Area recreational activities is thought to have approached 291 FTEs. This annual employment situation would be expected to continue each year over the next 20 years.

Timber

Annual Perspective

Alternatives A and B propose annual timber harvests that range between 500,000 and 1,000,000 board feet over the next 20 years.

The direct annual output value of the proposed timber harvests could range from $87,500 to $220,000, depending upon the volume sold and the related wholesale timber price at the mill. Total area output value (direct, indirect, and induced) would increase by between $210,800 and $529,900 per year as the result of the range of timber harvesting proposed.

Direct timber sector income could benefit by between $19,700 and $49,500 per year and total area income (direct, indirect, and induced) by between $46,000 and $115,700.

Area employment is not greatly affected by timber sales. Direct annual employment by the timber sector could rise by 1 to 3 FTEs and total (direct, indirect, and induced) area employment might increase by between 3 to 7 FTEs.

Summary

SUBJECT	UNITS	ALTERNATIVES A and B
Harvest Level	MBF	500 to 1,000
Price/MBF	Dollars	175 to 220
Direct Output Value	$1,000	
At 500 MBF/YR		
@175/MBF		1,750
@220/MBF		2,200
At 1,000 MBF/YR		
@175/MBF		3,500
@220/MBF		4,400
Total Output Value	$1,000	
At 500 MBF/YR		
@175/MBF		4,216
@220/MBF		5,300
At 1,000 MBF/YR		
@175/MBF		8,430
@220/MBF		10,598
Direct Sector Income	$1,000	
At 500 MBF/YR		
@175/MBF		394
@220/MBF		494
At 1,000 MBF/YR		
@175/MBF		788
@220/MBF		990
Total Area Income	$1,000	
At 500 MBF/YR		
@175/MBF		920
@220/MBF		1,158

SUBJECT	UNITS	ALTERNATIVES A and B
At 1,000 MBF/YR		
@175/MBF		1,840
@220/MBF		2,314

Sodium/Trona

Alternative A (the no action alternative) would result in the same level of annual trona output and related employment as currently exists. Subsequently, trona production would average about 5 million tons/year. Over the next 20 years, about 100 million tons of trona would be produced with a total output value of over $6.7 billion. According to economic multipliers supplied by the University of Wyoming, this level of trona output would be responsible for $12 billion of the Area's total (direct, indirect, and induced) economic output over the 20-year period.

Currently, the major trona producer within the resource area, Rhone-Poulenc, produces about 64 percent of the annual area output of trona and employs about 539 people. The other two Area trona producers, FMC Wyoming Corp. and Texasgulf Chemical Corp. each produce about 18 percent of Area production. The level of their annual local trona related employment is not known as the operations are divided between two resource areas.

Oil and Gas

See discussion under Preferred Alternative.

Coal

Impacts are the same as those addressed in the Preferred Alternative.

Coalbed Methane

Annual Perspective

Under both Alternatives A and B, the highest projected number of producing wells (232) would occur in the year 2000, which is the last year in which resource specialists felt justified in estimating future activities for this resource. However, the highest annual output of methane is expected to occur in 1996 at about 39.19 billion cubic feet under the "no tax credit" example, or 21.94 billion cubic feet under the lower output of the "tax credit" example. The estimated value of gas at the well head in 1996 (at $1.00 per thousand cubic feet) would subsequently range from almost $22 million to over $39 million. Even though the number of wells rise over the years 1996 to 2000, a decline in direct annual output of about 8,100 cubic feet in the "tax credit" example and almost 19,500 cubic feet in the "no tax credit" example is projected due to declining production from some wells.

Under these alternatives, the minimum amount that the 1996 coalbed methane activities could contribute to total (direct, indirect, and induced) annual area output is estimated to range between $33 million and slightly over $59 million, depending upon which output assumption is being considered. By 2000, this range narrows to between about $19 million and $30 million.

Direct income to coalbed methane sector households in the maximum output year of 1996 is projected to range from slightly over $1.8 million to about $3.2 million. By comparison, a $1 million to slightly over $1.6 million range is expected by 2000.

The level of coalbed methane activities proposed could result in a minimum increase of about $3.7 million to almost $6.6 million in total (direct, indirect, and induced) area income in 1996. This contribution to total area income is expected to decline to between about $2 million and $3.3 million by 2000.

Direct employment related to coalbed methane activities would be highest at 198 FTE in 1993 when the number of wells drilled/year is projected to be the highest (100). By the year 2000, when drilling activity is estimated to be at a minimum of 5 wells/year and producing wells number 232, direct employment is expected to total 72 FTEs.

The level of coalbed methane activity projected for 1993 could add about 686 FTEs to the area's total (direct, indirect, and induced) employment numbers. By 2000, this benefit is expected to decline to around 250 FTEs.

Summary

Projections for Alternatives A and B place minimum output potential for coalbed methane over the 20 years (1991-2010) at about 125.53 to 218.83 billion cubic feet. At $1.00 per thousand cubic feet, this amounts to between $125.5 million to slightly over $218.8 million in direct output value at the well head. The minimum contribution of 20 years of coalbed methane activity to total (direct, indirect, and induced) area output could total from $189 million to almost $329.6 million.

Direct income accruing to area households from coalbed methane activities during this time period is estimated to be at least $10 million to $18 million, while the minimum contribution to total (direct, indirect, and induced) area income could amount to between $21 million and $37 million.

Vegetation

Selective requirements imposed on prescribed burns to avoid violation of ambient air quality standards could increase costs and alter prescribed burn plans. Dust clouds caused by vehicle traffic on major dirt roads covers vegetation and limit photosynthetic processes up to one mile from centerline. Industrial plant stack emissions may alter plant communities in the immediate vicinity and downwind from the emission source.

Generally, stipulations and management actions imposed to protect cultural and paleontological resources benefit and protect vegetation. Limitations imposed within the visual horizon of designated and nondesignated historical trails could alter areas considered for prescribed burning. Concentrated invertebrate and vertebrate fossil collection activities would continue to cause surface disturbance and result in removal of vegetation.

Prescribed burning would cause a long-term decrease in shrub species, a short-term increase in annual weeds, and a long-term increase in grass species on 26,000 acres. Total forage production declines for about the first two growing seasons following a prescribed burn. After the second year, livestock and certain big game (elk) forage increases, and range condition and forage production improves in the third year after a burn. Prescribed burns in decadent aspen stands would, with proper grazing management, stimulate sprouting and reproduction of aspen and alter age class structure. Prescribed burns conducted during the hot season (low soil moisture) would limit sprouting and regeneration of certain mountain shrub species, primarily antelope bitterbrush, and could cause less diverse species composition and longer recovery periods. Cool season prescribed burns (high soil moisture) would provide a greater opportunity for mountain shrub regeneration and sprouting, and would provide greater species diversity and shorter recovery periods.

Wildfires would continue to cause a short-term loss of vegetation and big game and livestock forage on rangelands. Within three years, livestock and certain big game (elk) forage would generally exceed original levels as grasses replace shrubs. The surface disturbance associated with fire line construction, the use of heavy equipment, and other fire suppression activities often damages or destroys vegetation and accelerates natural soil erosion. In forested areas, wildfire changes the vegetative composition from forest to the open grass/shrub type. Wildfire usually occur on the high and low density sagebrush, juniper, conifer, and aspen LANDSAT classes.

Harvest of 500,000 to 1,000,000 board feet of timber from 7,943 acres would reduce age class and plant species diversity. Construction of access roads to timber sales would remove vegetation for a period of approximately 10 years unless the road is used by the public, in which case vegetation would be permanently removed. Forest management activities in commercial stands are limited to conifer LANDSAT classifications. Forest management activities in woodland forests would generally benefit native plant communities. These stands would be managed for watershed, recreation, and wildlife considerations. Forest management activities in woodland stands are limited to the juniper and aspen LANDSAT classifications.

With the exception of desert land entries, most of the impacts to vegetation from lands/realty actions are covered under impacts to livestock grazing in terms of forage (AUMs) lost. Farming on desert land entries would cause existing vegetation to be replaced by irrigated crops or hay. The value of production depends on crop yield and price. Crop production would change the vegetative composition and would involve such activities as tilling the soil; seeding crops; irrigating; applying fertilizers, herbicides, and insecticides; and harvesting. Farming on desert land entries probably would occur on the saltbush, low density sagebrush, greasewood, and high density sagebrush LANDSAT classifications.

At current actual grazing levels of approximately 180,000 AUMs, localized overuse of forage occurs. The localized overuse of forage by domestic livestock affects riparian and wetland values by causing increased soil erosion, compaction, and invasion of less desirable plant species. Localized overuse of forage can result when too many animals graze in an area for too long a time. When forage is overused, plants cannot provide for their own growth, maintenance, and reproduction, so they are eventually replaced by less desirable species, many of which produce little or no forage. This can lead to a downward trend in range condition. Such a situation can encourage accelerated soil erosion and further site deterioration. Within 20 years, expected grazing levels could be 318,641 AUMs, or active grazing preference levels. Areas receiving localized overuse of forage could be expected to increase, and riparian area condition and trend would decline in most grazing allotments. Grazing use could be expected to increase in areas that are currently receiving little if any grazing use.

Although all 12 LANDSAT vegetation classifications are affected by livestock grazing, most impacts occur on the saltbush, low density sagebrush, high density sagebrush, aspen, juniper, riparian, and greasewood classifications.

Rangeland project construction and implementation would remove vegetation from 105 acres which would rehabilitate to at least good range condition after 20 years. Project construction is most prevalent in the low density sagebrush, high density sagebrush, saltbush, greasewood, and riparian LANDSAT classifications.

Mechanical manipulation of vegetation (chaining, chemicals, contour furrowing, ripping, etc.) would improve range conditions but would result in a change in vegetation composition and would temporarily remove target species. Chemicals used to remove sagebrush and noxious weeds could impact nontarget vegetation on localized areas.

Fencing is used to improve forage and habitat condition on upland and wetland sites. Range condition should improve in localized areas when fences are used to implement AMPs or better distribute livestock. In wetlands, fencing would control livestock use and improve habitat and watershed condition. More diverse vegetation would be produced, and soil erosion would be reduced.

Water developments, including wells, springs, and pipelines would improve livestock and wildlife distribution and encourage more uniform utilization of forage and less damage to certain vegetative types. Reduced grazing pressure reduces vegetation damage, compaction, and erosion. Fenced water developments create additional riparian vegetation and associated wetlands.

Livestock conversions from sheep to cattle generally cause additional utilization of riparian vegetation, if present. Conversions from cattle to sheep generally result in greater utilization of upland areas and shrub species.

Allotting forage that is unallotted would cause greater utilization of forage that is currently unavailable for livestock grazing. Increased utilization could result in species composition changes or a decrease in vegetative production and plant vigor.

Impacts to vegetation from oil and gas and mining activity are generally expressed in terms of AUMs lost or temporarily removed pending reclamation. These impacts are addressed in the livestock grazing management section. Construction of drill pads, roads, facilities, pipelines, powerlines, and other structures associated with oil and gas operations would result in the loss or removal of vegetation from 24,629 acres over the next 20 years. Reclamation of disturbed sites would be accomplished on approximately 14,500 acres; therefore, total net loss of vegetation is expected to be approximately 10,000 acres over the next 20 years.

Activities associated with coalbed methane projects are expected to remove vegetation from 3,772 acres over the next 10 years. Reclamation of disturbed sites is expected to occur on approximately 2,330 acres; therefore, there would be a net long-term loss of vegetation from approximately 1,440 acres.

Coal mining activities at the Bridger, Black Butte, Stansbury, and Lion Coal Mines are expected to remove vegetation from approximately 24,500 acres over the next 20 years. Reclamation of disturbed sites is expected to occur on approximately 15,790 acres; therefore, there would be a net long-term loss of vegetation from approximately 8,710 acres.

Vegetation would continue to be disturbed by activities associated with mining of other leasable solids (sodium and phosphates) and salable minerals. In most cases, the poor growth mediums of the soil types and the low precipitation in areas where these activities occur makes it difficult to replace the original vegetative community through reclamation.

Geophysical exploration usually would continue to disturb vegetation on less than one acre per mile of operation.

Repeated off-road vehicle use would continue to damage vegetation because vehicle tires crush and tear plant tissues, and eventually destroy plant cover. These activities often occur in areas that are too steep or erosive for road construction. The combination of vegetation loss and activity on steep erosive soils produces excessive soil erosion and causes further impacts associated with sedimentation on adjacent areas. All vegetation classifications are damaged by off-road vehicle use, but such damage is most common on badlands, low and high density sagebrush, juniper, saltbush, and sand dune LANDSAT classifications.

Recreation area support facility construction would remove vegetation. Concentrated recreational activities, especially around and near riparian areas would continue to damage vegetation through trampling, digging, cutting, or pulling. ORV rallies, cross country races, and other such outings would damage or totally remove vegetation from the event route.

Management activities implemented to protect candidate plants generally benefit other vegetation. Restricting construction of rangeland improvements and prescribed burns in actual and potential candidate plant locations may not benefit livestock, wild horse, and wildlife grazing distribution patterns and may lead to greater utilization of vegetation in other areas.

Proposed wild horse numbers are at a level that would stabilize current range conditions in most of the herd areas. Continued concentration of wild horses near watering sources would severely damage vegetation in localized areas through trampling, trailing, and overgrazing. Promotion of wild horse grazing in dry areas through the development of watering sources would reduce localized overuse and trampling of vegetation. Although wild horses can be found grazing in all of the LANDSAT classifications, the communities generally impacted include high density and low density sagebrush, saltbush, juniper, and greasewood.

Management actions described to protect visual qualities, wilderness values, wild and scenic rivers, special management areas, wildlife habitat, watershed values, and to reduce channel erosion generally benefit and protect native vegetative communities. Some short-term disturbance of vegetation could be expected due to construction of wildlife habitat and watershed improvement projects.

Summary

There would be a short-term increase of annual weeds and a short-term decrease in vegetation production on the 26,000 acres proposed for prescribed burns. However, there would be a long-term increase in grass species and vegetation production. Wildfire would create a similar affect for both short and long term.

Localized over use of forage would continue and could increase if full livestock grazing preference is achieved. Riparian areas could decline over the long term.

A short-term impact would occur from the construction of rangeland improvement projects removing vegetation (about 105 AUMs); however, a long-term benefit to overall vegetation production through improved distribution would occur.

Approximately 20,150 acres of mostly low density sagebrush would be lost over the long term due to development activities. In specific areas this could be important, but planning area wide it is not expected to be significant.

Land disposals would result in an irreversible and irretrievable loss of the vegetation resource as most disposals are for urban expansion or industrial development.

Visual Resources

Under Alternative A, there would not be any changes to the VRM classifications. About 423,000 acres or 12 percent of public lands in the planning area would be managed to retain visual values (Class II), 330,000 acres or 9 percent would allow for some modifications (Class III), and about 2,858,000 or 78 percent would allow major modifications in the landscape to occur.

Viewshed aesthetics and resources would be affected by fire, timber harvest activities, and lands and realty actions in the short term. Natural, human-caused, or prescribed fires would detract from visual resources. Timber harvesting, clear cuts, and related road construction would also detract from visual resources. Rights-of-way, particularly pipelines and roads, can have long-term affects to visual resources due to the time frames necessary to re-establish vegetation cover, and the straight line route these actions follow. Therefore, Class II designations would always have to be analyzed before any of these activities would be allowed.

Sand and gravel, mining operations, and oil and gas development impact visual resources with surface disturbing activities. In Class II areas, an analysis of actions must be concluded before a proposal can be undertaken. Old oil and gas fields would continue to be an eyesore and retain a "rehabilitation area" visual management prescription.

Vegetation treatment prescriptions such as treatment units within VRM Class II areas would not exceed 40 acres in size unless site specific analysis determines that VRM Class II objectives would be met and would enhance visual resources. Maintaining vegetative buffer strips between developed recreational facilities and live water would have a beneficial affect to visual resources.

Management of BLM-administered lands in accordance with visual standards to protect, maintain, enhance, and rehabilitate areas would enhance visual resources.

The avoidance of identified areas not suitable for linear rights-of-way would protect the sensitive visual resources in these areas.

Protecting National Historic Trails and other trails by not allowing visual disturbance, no surface occupancy on cultural sites and limiting geophysical vehicles to designated roads and trails in the South Pass Historic Landscape would enhance visual values and protect the visual sensitivity of these areas.

Actions such as maintaining, improving, or restoring riparian values to provide enhanced forage, habitat, and stream quality; managing all other forest lands for watershed, wildlife, and scenic values would benefit visual values and, in some areas, improve the classification.

In designated special management areas, such as ACECs, a plan of operations is required for any surface disturbance activities, regardless of acreage, which would help maintain visual resources. About 104,900 acres or 3 percent of the planning area would provide benefits to visual values.

Establishing a "greenbelt" along the Green River would enhance visual resources. Buffers around recreation sites near riparian areas would enhance visual resources.

Summary

Long-term effects would occur from nonimprovement of rehabilitation areas. Linear facilities such as roads and pipelines would have a long-term effect on visual resources due to their high visibility and the extended periods of time for natural vegetation cover to become reestablished.

Short-term effects would occur to visual quality from smoke associated with prescribed fire and wildfire and the subsequent modification of vegetation; and dust from development and logging activities. Reduced air quality from development and natural causes would have an individual short-term effect. Approximately 74,600 acres would be disturbed over the term of the plan and about 30,900 acres would remain disturbed over the long term. The level of affected air quality cannot be determined but is not anticipated to be significant for the whole planning area.

Watershed/Soils

Cultural resource data recovery excavations, because of their limited area extent, minimally affect soils although locally the impacts can be quite destructive. Proposed projects suggest 7 to 10 acres per year would be disturbed which could generate maximum soil losses of 350 to 500 tons per acre per year.

Fire suppression would cause soil erosion in burned areas at rates dependent on the intensity of the fire and suppression efforts. Full suppression could lead to soil losses of up to 15 tons per acre. Prescribed burns generally affect soil much less than firefighting efforts. Soil loss may increase immediately after the burns due to the removal of vegetation. However, productivity should increase 2 to 3 years after burning with accompanying reductions in soil losses.

There would continue to be minimal soil impacts from Forestry mainly because of a lack of extensive cutting activity. The main impact would be compaction on roads and trails as well as increased erosion due to loss of vegetation.

Timber harvest if done too intensively can create runoff regimes which provide larger sediment, salt, and phosphate loading to the Green River Basin. In addition, such tree removal, if done next to a stream, very often results in higher stream temperatures and affects fish survival.

Although timber harvest is a minor activity, public demand for firewood is not. This activity has an associated high road density which routes storm runoff causing rill and gully formation on and below the road. This provides more sediment transport and erosion than that of a natural condition.

Land actions such as rights-of-ways for linear actions such as pipelines, roads, etc., can adversely affect watershed resources. Because of the extent of these rights-of-way and the related runoff, a very large amount of sediment, salt, and phosphate are produced from the erosion occurring on them (Table 3-16).

Restrictions on Desert Land Entries would prevent unsuitable soils from being cultivated, thereby limiting sediments and salts from entering the Green River/Colorado River system.

Generally, livestock grazing impacts to soils would be more extensive in allotments without AMPs due to the intensity of use and the lack of grazing systems. Adverse impacts would result from trampling of vegetation, soil compaction, and reduction or change in protective vegetation cover. Since these factors influence erosion rates and sediment yield, soil stability trends would continue to decline at present levels of management in these areas. Wild horses would have similar impacts to the vegetation as livestock. Impacts, however, would be more localized since the horses occupy a limited area.

Placing salt next to streams and springs causes soil compaction and creates an area denuded of vegetation and saturated with salt. The results of this are much the same as overutilization of riparian areas.

The emphasis of the minerals program is the largest, most obvious impact to the water and soil resources. Impacts include sedimentation, salt and phosphate loading, groundwater contamination, bank and channel in stability, loss of aquifers, retort leachate production, augmented flows, soil productivity, and water disposal.

Although adverse affects to groundwater cannot be seen, the possibility exists for groundwater contamination from improper casing and cementing operations, undetected or unreported spills or leachate migration from trona settling ponds and produced water pits. In addition, dewatering of aquifers during the production of coalbed methane can adversely effect both quantity and quality of groundwater since such large areas are dewatered and the produced water is either reinjected or evaporated.

Strip mining of coal has some rather unique impacts associated with it. The most important impacts are the complete recontouring and denuding of the landscape and the backfilling of industrial wastes associated with mining into the open pits. The result of the recontouring and denuding can create a situation that augments flood flows unless retention ponds are used. These flows, if allowed to go unchecked, can force stream channels in the area to regrade themselves in response to such flows. This commonly results in incision and widening of the stream bed thus causing more sedimentation, salt, and phosphate loading. However, with the proper sediment catch basins and other runoff control, the presently operating coal mines are not expected to pose much of a problem to the Bitter Creek watershed.

Off-road vehicle use can often impact water and soil resources if done in an uncontrolled manner. The largest impact from off-road vehicle use is sediment production and erosion from uncontrolled stream crossings and riparian area compaction from numerous poorly placed 4-wheel-drive roads.

Outdoor recreation centered around water bodies affects bank stability along lakes and streams. Lack of channel stability can affect the stability of the riparian zone on which most camping and other activities occur. Compaction and or loss of the riparian area greatly reduces stream stability which in turn increases sediment, salt, and phosphate loads.

Another impact to water resources is the sewage pollution associated with recreating close to, or in, the water. If such activity becomes too large, often the sewage generated from such heavy use would result in eutrophication of downstream water bodies and increase the likelihood of water-borne diseases.

Overuse of riparian areas by recreation interests can lead to reduced shading of the water along streams as the woody riparian vegetation is stripped from the banks. This loss of shade can increase stream temperatures within a stream reach such that the dissolved oxygen required by fish is reduced to below acceptable levels.

Impacts from vegetation removal by fire or other means can have adverse impacts on stream hydraulics. Vegetative removal can cause an augmented flow regime which forces the stream channel to readjust its width and depth to accommodate the larger flows. This consequently produces an unstable stream which would produce large amounts of sediment, salt, and phosphate.

Vegetation manipulation to enhance wildlife habitat would cause minimal localized short-term impacts to physical and chemical characteristics of soils, increasing erosion susceptibility through the loss of both ground cover and litter accumulation. Over the long term, vegetation should increase over pretreatment production levels which would decrease the erosion hazard. The proposed burn on Little Mountain could influence the dynamics of unstable soils causing mass movement on unstable landscapes.

Impacts from instream fisheries projects can drastically change the channel dynamics as well as the physical position of the stream channel if not properly placed. The use of instream structures in the past have been a haphazard process where little attention was given to the location or size of the structure. This has created situations where structures have failed or where the channel has moved and created instability.

Summary

This no action alternative represents continuation of present management scenario where many effects would continue. Under this alternative, some attempt would be made at improving water quality by reducing erosion and sedimentation but for the most part this would be done in very localized areas such as on well pads and some roads.

While there would be surface-disturbance restrictions on steep slopes or in areas of known landslide potential, some development may occur in such areas resulting in slumping and accelerated soil loss which would be locally important but not significant. In areas of high landslide potential such as on the south face of Little Mountain, the likelihood of construction triggering slippage would increase, especially on toe slopes.

Long-term benefits would occur to watershed resources from mitigation measures and particularly no surface occupancy areas preventing disruption of soil and watershed values.

Some sediment loading and overuse due to livestock would continue over the long term but would decrease from current levels.

Wild Horses

Currently, the planning area provides habitat and forage for 1,350 wild horses. Average management levels range from 1,036 to 1,500 horses in four Wild Horse Management Areas. One interim Wild Horse Herd Area, Figure Four, has been eliminated because wild horses refuse to occupy the area.

Under this alternative, wild horse management would be continued as prescribed in the Wild Horse Herd Management Plans. The Divide Basin, White Mountain, Salt Wells, and Adobe Town herd areas would continue to be monitored. A total of 16,200 AUMs would be held in reserve for 1,350 horses.

Presently, there are no impacts to wild hose management due to management of air quality, recreation, or forestry.

Avoidance of significant cultural sites, limitations on activities within ¼ mile of historic trails, and subordination of activities to historic landscape values in some areas may constrain the BLM's ability to construct rangeland improvements aimed at achieving better distribution and management of wild horses. However, this would have a negligible impact on the wild horse program since, under this alternative, no improvements would be constructed solely to benefit wild horses.

There is no known impact to wild horse management associated with candidate plant management in actual plant locations. However, an impact could materialize because of no surface occupancy stipulations placed on 36,550 acres of potential habitat. This action could limit future project construction beneficial to wild horses in these areas.

A proposed land exchange in the Fourth of July allotment could affect wild horse movement if fencing is proposed to manage the consolidated private land.

In all of the wild horse areas it is expected that a minor impact would occur from surface disturbing activities. Table 4-29 describes in detail the acreage and AUMs that would be lost. A total of 4,109 AUMs would be lost to livestock and wild horse grazing.

Present impacts to wild horses from livestock grazing are yet to be determined by monitoring. The planning area has 318,647 active livestock AUMs, and over a five-year period, the average actual use by livestock has been 180,362 AUMs. Current BLM policy is to monitor the grazing use made by livestock, wild horses, and wildlife. Adjustments to active grazing preference would be made after analysis of monitoring data relative to objectives proposed in Allotment Management Plans. However, present livestock management practices seem to be causing minimal impact to wild horses primarily due to the large amount of non-use being taken by permittees planning area wide.

Brush treatment has been planned for 26,000 acres. A short-term loss of vegetation would occur in each herd area but a long-term increase in vegetation would be expected. Wild horses have been observed grazing burned areas 1 year after treatment, and heavy utilization has been documented in these areas.

The long-term loss of forage due to rangeland improvement project construction is estimated to be 90 AUMs. Not all improvements would be constructed in the wild horse herd management areas. It is estimated that 30 AUMs would be lost in wild horse herd management areas due to construction of projects.

BLM participation in the Wyoming Weed and Pest program would result in moderately beneficial impacts to wild horse management by removing undesirable weeds and encouraging growth of desirable vegetation.

There are impacts to wild horses due to current wildlife numbers, i.e., antelope, that are over the approved strategic plan numbers for a given herd management area. Overpopulation could create more demand and direct competition with wild horses for available forage.

Some harassment of wild horses from off-road vehicle users would continue. The management of 6 developed and 5 undeveloped recreation sites would cause no impact to wild horses.

Overgrazing of some areas by wild horses would continue because no water developments would be constructed for wild horse management.

There are three ACECs within the boundary of the Divide Basin Wild Horse Herd Area. Management actions in the Natural Corrals and Oregon Buttes ACECs would continue to cause no impact to wild horse grazing management. Utilization levels (50 percent) established for the Greater Sand Dunes ACEC may necessitate revision of AMPs and the Divide Basin wild horse herd management plan.

Wild horses would be placed under stress as a result of being captured. Some horses may be killed or injured. However, according to past experience, this number would be less than one percent of the horses gathered.

Summary

Short-term and long-term losses of forage would occur due to development activities, material sales, and rangeland improvements affecting approximately 2,727 AUMs. Prescribed burning on 26,000 acres and wildfire would have a short-term impact on forage but should result in a long-term increase in productivity of forage. Long-term impacts would affect another 1,503 AUMs due to range and wildlife improvements, lands and realty actions, and mineral developments removing forage for long periods of time.

Distribution problems would continue due to lack of water development in herd areas.

A long-term increase to full livestock grazing preference could create competition for forage.

Wildlife

Not managing Steamboat Mountain and Boar's Tusk-Killpecker dunes to protect natural and geologic features may leave these sites open to adverse disturbance to wildlife.

Forest resources in the Wind River Front, Pine, and Little Mountains would not be managed to enhance or maintain other resource values. This could increase impacts to wildlife habitat. A 25-acre clearcut management prescription could reduce calving and fawning areas and reduce quantity and quality of arboreal wildlife by 13 to 26 acres annually.

Lands and realty actions in this area have the potential to adversely affect wildlife habitat. Under this alternative, it is estimated that 9,605 acres of wildlife habitat would be disturbed over the next 20 years. This could cause adverse impacts to wildlife, especially in crucial winter ranges.

Linear rights-of-ways would be allowed within the Currant Creek watershed and avoided in the Red Creek ACEC. This could increase erosion resulting in loss of crucial Colorado River cutthroat trout habitat and increased silt loading to the Green River and Flaming Gorge.

Increasing the active grazing preference above the current 318,641 AUMs could cause adverse impacts to wildlife habitat. Currently, actual use is 180,000 AUMs. Construction of range improvements could help maintain current AUM availability, and herding would also be beneficial to wildlife.

Some localized overuse of forage and trampling damage presently occurs in uplands and riparian habitats under the current livestock grazing level of 180,000 AUMs. In many of the allotments where grazing levels are substantially below preference, habitats are generally improving.

Livestock use would continue to be licensed both in kind and in season of use. Some allotments contain lands unsuitable for livestock grazing. Other areas are suitable only for certain classes of livestock. During the development of AMPs, available livestock forage would be based on suitability criteria (slope, badlands, distance from water, etc.) which would generally benefit wildlife. Maintaining an active grazing preference of 318,641 AUMs could result in a downward trend in vegetation quantity, quality, and species composition and diversity even with implementation of AMPs and range improvements.

About 75 percent of riparian habitats would be in proper functioning condition within 10 years which would provide benefits to wildlife habitat.

Fences, even when properly designed, result in some wildlife mortality (big game animals, low flying birds, predators, and prey species). Fences constructed across migration corridors of big game increase stress, and may lead to increased loss in big game reproduction and direct mortality, especially during severe winters. Herding of livestock is preferred to fencing where adverse impacts to wildlife are contemplated. Fences on public lands would continue to cause direct and indirect wildlife mortality. Fences create a hazard to sage grouse, raptors, waterfowl, and other non-game species to a certain degree. Fences constructed across migration routes would continue to adversely affect big game, especially during severe winters.

Construction of livestock water developments within crucial big game winter ranges could have adverse impacts to big game populations and habitat. This could increase forage consumption by livestock and wildlife and would reduce available forage for wintering big game. Constructing water developments outside of crucial big game habitat could lesson competition for forage between livestock and big game. This may not adversely impact crucial big game habitat.

Authorizing livestock water developments in crucial winter ranges, ridgetop habitats, and low precipitation areas (less than 9 inches/year) may potentially reduce wildlife species richness by 10 to 15 percent. Wildlife would not benefit from these water developments as they probably would not be operated during critical periods when livestock are not in the area.

Inaccurate conversion ratios (sheep to cattle) and no application of suitability criteria has caused concentrated livestock use in riparian habitats (i.e., Sugarloaf and Red Creek allotments) where upland topography is poorly suited for cattle. Conversions from sheep to cattle have also resulted in more habitat competition to wildlife especially in relation to streams, wetlands, and big game parturition ranges.

Closing Palmer Draw and special exclosures to livestock grazing would protect them from deterioration.

Unallocated forage may go to livestock and not benefit wildlife habitat.

Future oil and gas activities would impact approximately 267 raptor nests, 1,160 acres of sage grouse nesting habitat and cover, and 7,320 acres of big game crucial winter range. The majority of this would occur within the Greater Nitchie Gulch (765 acres), Little Colorado Desert (1,525 acres), and Wamsutter Arch (555 acres) oil and gas fields. The remainder of the planning area would have 4,385 acres of disturbance within crucial big game winter ranges (Table 4-25). Greater Nitchie contains approximately 92 percent crucial big game habitat (primarily elk and deer), Little Colorado Desert contains approximately 38 percent crucial big game habitat (deer, antelope, and moose), Wamsutter Arch contains approximately 19 percent (antelope), and the remainder of the planning area contains about 36 percent crucial habitat.

Oil and gas development and maintenance activities in the Nitchie Gulch area have caused forage loss for big game and displacement from established habitats. Recently, elk were displaced from habitat in this area. In 20 years, about two-thirds of the area could again be available for elk use.

Actual wildlife habitat lost over the next 20 years due to oil and gas development would amount to 4,012 acres in the Little Colorado desert, 3,084 acres in Wamsutter Arch, 872 acres in Greater Nitchie Gulch, and 12,300 acres in the remainder of the planning area (total 20,268 acres). These acreages would not be fully reclaimed and portions would remain out of usable habitat for wildlife for 20 years or more. Limited rainfall, poor soils, and severe winter conditions make reclamation difficult, increasing the time required to re-establish suitable vegetation to pre-disturbance composition and density.

Seasonal stipulations would not provide adequate long-term protection for wildlife. Development of long-term land use activities would continue to displace wildlife and disrupt nesting/fawning areas during operation of the activity.

The planning area has a proposal for 20,491 acres of coalbed methane development with other proposals being developed. Under the current proposal, it is projected that up to 300 wells would be drilled. More than half of the 20,491 acres are in crucial big game winter range and parturition areas. Three hundred wells could disturb up to 3,081 acres of big game habitat. Road activity and displacement associated with coalbed methane development could adversely affect 79,540 acres of crucial elk habitat and 28,552 acres of crucial antelope habitat. Most of the proposed development is in the Steamboat elk herd unit. Coalbed methane development under Alternative A could displace 300 to 400 of the Steamboat/Sands elk herd and may cause them to move into the Wind River Mountains and other areas of suitable habitat with less human disturbance. Disruption distance ranges from 0.75 miles to 2.5 miles for elk from human disturbance in this desert environment. Most of the Steamboat/Sands elk calving habitats (87 percent) are within potential coalbed methane areas.

An estimated 28,552 acres of crucial antelope winter range in the Killpecker drainage could be adversely affected through forage loss, stress, and displacement for the life of coalbed methane extraction. Actual surface disturbance through roads, pipeline, drill pads, water storage pits, and plant facilities may amount to 3,081 acres or more.

Mining and associated activities could remove 22,000 acres of big game habitat over the short term. Even after some reclamation, an estimated 22,800 acres would be lost for big game use over the long term. Surface mining of coal could adversely affect about 186 raptor nests and about 15,050 acres of suitable raptor habitat.

The known sodium leasing area in the planning area is open for development with protective and no surface occupancy (NSO) stipulations within this alternative. In the trona deposition area, 177,885 acres are designated as crucial pronghorn winter habitat. According to the Sodium Mineral Development Environmental Assessment, 3 percent of the crucial antelope winter range within the known sodium leasing area would be disturbed.

No development of zeolite would occur if the oil shale withdrawal is not revoked. No impact to wildlife would result from no action.

Potential development of gold (53 acres) and jade (6 acres) was analyzed under this alternative. Potential adverse activities associated with this kind of development include access and haul road development, waste water and tailings disposal, vegetation removal, soil contamination, noise, dust, and human activity.

Seismograph exploration during winter months in crucial big game winter range could have adverse effects to wildlife depending on severity of conditions. Displacement of big game from crucial winter ranges into adjacent winter ranges may result in habitat deterioration. Creation of new roads after geophysical explorations may decrease available wildlife habitat through displacement from these areas. Raptors, sage grouse, and big game fawning or calving areas could also be adversely affected by geophysical operations. An estimated 450 miles of short-term disturbance to wildlife occurs annually.

Under ORV management prescriptions, adverse impacts to wildlife should be minimal. Beneficial impacts from a higher level of ORV management and enforcement could reduce stream siltation, improve plant density, and reduce stress to wildlife.

Adverse impacts to wildlife habitat are anticipated where camping is permitted on crucial water sources and in riparian habitats. These activities can cause destruction of vegetation, soil compaction, stream siltation, and pollution. Adverse impacts to raptors and other wildlife may occur at existing or new recreation sites from the presence of humans and their activities. Non-designation of backcountry byways may beneficially impact wildlife by reducing vehicular intensity and wildlife displacement. Increasing visitor and hunting use indicates that camping on crucial wildlife waters could displace sage grouse, morning dove, big game, and all wildlife dependent on waters in the desert environment. Camping on wildlife water may result in contamination and degradation of these sources. Placement of permanent high profile structures within ¼ mile of active strutting grounds would provide cover for predators which could lead to mortality and adversely affect sage grouse.

Chemical treatment of rangelands could adversely affect amount and quality of available forage and cover for wildlife.

Vegetation treatment in riparian areas and river islands can enhance wildlife habitats and improve forage and plant diversity. Spawning areas could be adversely impacted in the short term due to silt deposition following treatment if not protected through buffer strips.

Management actions taken under Visual Resource Management would have beneficial benefits to wildlife and wildlife habitat.

Summary

Continuation of existing management would continue both beneficial and adverse impacts to wildlife habitat.

Adverse impacts to crucial wildlife habitats (i.e., riparian areas) from livestock grazing would continue and could increase if all AUMs are activated. Development of new AMPs and/or revision of old AMPs to include riparian objectives or to protect other crucial wildlife habitats would occur and benefits would accrue slowly. Until new range surveys or sufficient monitoring is conducted to determine AUM availability, crucial wildlife habitats would continue to decline in some areas.

Fences on public lands would continue to cause direct and indirect wildlife mortality. Even properly designed fences create a hazard to sage grouse, raptors, waterfowl, and non-game species.

Seasonal stipulations provide short-term protection for wildlife. Long-term maintenance and operations activities in crucial wildlife habitats would continue to cause displacement of wildlife from crucial habitats, including disruption of nesting, fawning and calving areas, and crucial big game winter habitats.

The combination of mineral and livestock activities in crucial wildlife habitats (i.e., big game winter ranges, parturition areas, riparian areas, etc.) could create impacts that may be unacceptable in some locations (e.g., Steamboat Mountain area, Cedar Canyon, etc.). Displacement of part of the Steamboat Mountain elk herd could result in not being able to maintain a viable hunting population.

Displacement and loss of habitat from development and disruptive activities would create an unavoidable adverse impact (see Table 4-25).

Activation of livestock grazing preference could, in the long term, create competition for forage and could adversely affect capabilities of meeting habitat requirements for Wyoming Game and Fish Department Strategic plan levels. Long-term impacts would continue to occur to wildlife habitat due to mineral production activities and year round use in crucial areas.

Special Management Areas

Candidate Plants

Activities such as wildfire and related suppression activities, areas where livestock concentrate (salting, watering), chemical control of noxious weeds, geophysical activity in potential habitat areas, off-road vehicle use, increased recreation use, trampling by wild horses, closure or expansion of the McKinnon dump, and conversions of sheep to cattle all contribute to an irreversible irretrievable loss of the plant populations. Mining claim activity and unauthorized uses could create an unavoidable adverse impact and could result in an irretrievable loss of plant populations. However, management prescriptions for known population sites and potential habitat areas would benefit populations and should offset most of these adverse effects in the long term.

Cedar Canyon ACEC

The major petroglyph in the Cedar Canyon ACEC would be beneficially affected by management prescriptions. A 20-acre exclusion area around the petroglyph would be protected from most intrusions, which would respect spiritual concerns expressed by Native Americans. The 20-acre petroglyph site would be an exclusion area for rights-of-way which would offer increased protection for this site. Constraints on mining activity would prevent major disturbance from strip mining activity from occurring which would benefit the area in the long term.

Management activities in Cedar Canyon could have some long-term adverse impacts on area values. Visual intrusions could destroy the integrity of the setting of the petroglyphs. Other areas within the ACEC, including small isolated petroglyph sites, would not have the same level of protection as the 20-acre petroglyph site which could result in some adverse effects to them. Displacement of big game from crucial winter range habitat would continue over the long term due to continued traffic and road use, construction, and production activities. Habitat availability could decline with further development activities and over-the-snow vehicle use.

Vehicle activity, including over-the-snow vehicle use, would continue and adversely affect highly erosive soils and wintering wildlife.

Greater Sand Dunes ACEC

In the western portion, no impacts are anticipated with implementation of the prescribed management actions and restrictions and with implementation of the Interim Management Guidelines for Lands Under Wilderness Review.

In the eastern portion, management prescriptions and restrictions would be designed to preserve and protect the geological, cultural, visual, and wildlife values associated with the Greater Sand Dunes ACEC. Implementation of the prescribed measures would reduce or minimize impacts associated with mineral development, lands actions, and off-road vehicle use. Residual impacts would be minor and would include:

> Seasonal displacement of wildlife, predominantly elk and deer, as well as wild horses, would occur through ORV activity. Seasonal displacement would be most prevalent during the summer and fall months.
>
> Loss of vegetation on stable dunes would potentially occur through the development of oil and gas reserves and through facilities associated with oil and gas development. Potential oil and gas development in the 6,000 acres open to 3 wells per section could disturb up to 98 additional acres.
>
> Reductions in the visual integrity of the area would result from development of up to 25 to 30 new oil and gas wells. Surface facilities (e.g., pipelines, snow fencing, etc.) would create safety hazards to off-road vehicle users.
>
> Dune ponds and related riparian habitat would continue to be affected by livestock, wild horses, and wildlife use.

Benefits that would be realized through the management prescriptions and restrictions include protection of sensitive cultural resource sites and Crookston Ranch, and the protection of the Native American religious and important geological values associated with the Boar's Tusk.

Additional benefits would occur from the acquisition of approximately 1,920 acres to consolidate public lands in the dune area which would enhance wilderness, visual, and wildlife values and the removal of abandoned facilities and the marking of known hazard areas would reduce some of the potential impacts to off-road vehicle users. Retention of 10,390 acres as an "open" ORV area for recreational uses and retention of forage and native plant compositions for wildlife would provide further benefits.

Monument Valley Area

Some long-term impacts may occur to soils, slopes, and visual values due to activities on adjacent private lands requiring access across public lands. Silt production and sedimentation would occur. Unauthorized use could continue and result in an irretrievable loss of soil, cultural, and paleontological resources. Restricting surface disturbance on slopes greater than 25 percent and on erosive soils, and restricting off-road vehicles to existing roads and trails should lessen impacts and benefit watershed and vegetation resources. However, there would be residual disturbance to fragile soils caused by continued off-road vehicle use of existing roads and trails.

Management of the area would provide for solitude and dispersed recreation but no additional facilities would be provided which could, in the long term, limit recreation opportunities. Management of wild horses would benefit area values.

Oil and gas management and production would benefit in the short and long term.

Management of the area would mean managing cultural resources under standard Section 106 compliance procedures which should prevent any significant cultural resources from being impacted.

As no inventory for paleontological resources would be required prior to surface disturbing activities, there could be a loss of scientific data or significant fossil resources.

Revocation of the oil shale withdrawal, and no additional withdrawal of lands within the area could result in mineral location and increased surface disturbance resulting in loss of paleontological resources and adverse affects to erosive soils.

Natural Corrals ACEC

Management prescriptions including the existing withdrawal, road closure, and other protective measures in management of the Natural Corrals ACEC would have beneficial effects on cultural, wildlife, and visual resources.

Unauthorized uses such as off-road vehicle use would adversely affect cultural, geological, and wildlife values. Wildlife and livestock grazing would adversely affect riparian zones in the short term.

Locatable mineral development activities outside the withdrawal area would adversely affect resource values for the long term and would cause an irretrievable loss of resource values.

Management for Class IV visual values would allow modifications to the landscape; however, this affect would be minimal as few alterations could occur. Coal development on 160 acres of private surface Federal coal lands would adversely affect resource values in the ACEC and would cause an irretrievable loss.

Oregon Buttes ACEC

The natural values of the Oregon Buttes ACEC would benefit from resource management prescriptions. Dispersed non-motorized recreation use would benefit area values; however, some use would be limited because of the inability to utilize vehicles for access.

Pine Springs ACEC

The 90 acres of Pine Springs would be retained as an ACEC and additional acreage would not be designated. Mineral development activities could be allowed on 730 acres surrounding the ACEC, causing adverse affects to cultural values. Unauthorized uses could result in an irreversible irretrievable loss of ACEC value. Maintenance of range improvements could have a short-term adverse impact to ACEC values.

Red Desert Watershed Area

Management prescriptions in areas such as the proposed South Pass Historic Landmark and candidate species would provide benefits to the resources in those areas. Management prescriptions for the remainder of the 481,930-acre watershed would allow activities that would create adverse affects; however, these would not have a significant impact on the watershed.

Although VRM classes would not be changed, long-term impacts could occur to visual values from construction of facilities, particularly powerlines. Most activity is anticipated to occur in the southern checkerboard portion of the area, and visual impacts would be localized to this area. Off-road vehicle use would be limited to existing roads and trails which would reduce erosion and visual degradation.

Management under Alternative A would provide reduced the level of solitude and dispersed recreation due to increased oil and gas development. However, the adverse impact should not be significant.

Approximately 90 oil and gas wells would be drilled in the area, with 80 anticipated to be drilled in the checkerboard. One hundred and seventy-three (173) plugged and abandoned wells already exist in the area. Development activities remove vegetation creating a short-term loss of the vegetation resource with some long-term loss of shrubs as restoration requires 20 years or longer. Impacts to vegetation affects available AUMs for livestock and horses and wildlife habitat. The amount affected would not be significant.

Coal mining in relation to the Bridger mine and Deadman Wash proposed project would affect only a small portion of the watershed.

South Pass Historic Landscape

Geophysical activity and off-road vehicles would be allowed on 46,180 acres which, along with unauthorized vehicle use, could increase the number of two-track trails in the area. Allowing this type of use to continue could cause the values making the area eligible as a Rural Historic Landscape to be lost. Limiting all vehicles to existing roads and trails on 46,180 acres and closing 41,400 acres would reduce some short- and long-term impacts to cultural values.

No withdrawal would be pursued, leaving the 5,260-acre landmark subject to impacts of mining claim activity which could adversely affect the area. Wildfire and related suppression activities could affect visual resource values and cause additional surface disturbance.

Steamboat Mountain Area

Surface disturbing activities, including 50 coalbed methane wells, traditional oil and gas activity and rights-of-way, would result in a long-term loss of wildlife habitat and subsequent displacement of wildlife and in particular the portion of the Sands Elk herd on Steamboat Mountain. Coalbed methane development under Alternative A could displace 300 to 400 of the Steamboat/Sands elk herd and may cause them to move into the Wind River Mountains and other areas of suitable habitat with less human disturbance. Disruption distance ranges from 0.75 miles to 2.5 miles for elk from human disturbance in this desert environment. Most of the Steamboat/Sands elk calving habitats (87 percent) are within potential coalbed methane areas. This would also result in a long-term loss of watchable wildlife opportunities, and a loss of forage for livestock and wild horses. Unauthorized uses would further displace wildlife. This displacement of wildlife and subsequent loss of watchable wildlife opportunities would be considered a significant effect.

Camping around springs in the area would continue to impact riparian vegetation and water quality for the long term.

Tri-State Monument Area

Management prescriptions for Currant Creek and Sage Creek and maintaining the status quo in the Red Creek drainage would continue to allow accelerated erosion associated with human activities to continue. Soil stability and productivity would not increase until the vegetative cover is improved and additional disturbances are properly mitigated, reduced, or eliminated. Unnecessary rill and gully erosion would continue until linear disturbances (roads, pipelines) are stabilized through improved maintenance, or closure and reclamation.

Coal mining activity would not occur and there would be no adverse affects to the area.

Measures to control erosion would be generally beneficial to cultural resources by curtailing natural deterioration of numerous buried archaeological sites within these drainages.

Short-term adverse impacts would occur from vegetation manipulation but should result in long-term benefits. The entire area would benefit from wildfire suppression restrictions. Off-road vehicle activity which is limited to existing roads and trails could, over the long term, lead to an increase in two-track trails which would adversely affect water quality, watershed values, and fisheries habitat.

Natural geologic erosion would continue for both the short and long term and would be considered an unavoidable adverse impact.

Currant Creek/Sage Creek

Short-term impacts would occur from vegetation manipulation but should result in long-term benefits. The no surface occupancy requirement within the 23,740-acre Currant Creek area would ensure long-term reductions in sediment loading and enhancement of fisheries habitat. The designation of all but Sage Creek as an avoidance area to rights-of-way would also reduce sediment loads. The avoidance of rights-of-way throughout the area would require major reroutes of facilities around this area. Closure to sodium exploration within the Currant Creek drainage would mean a loss of revenue from mineral resource development. Sage Creek would benefit over the long term from the preparation of plans to mitigate impacts prior to disrupting and disturbing activities. Off-road vehicle activity over the long term could adversely affect water quality, watershed values, and fisheries habitat.

Red Creek

Maintaining status quo in the Red Creek drainage would allow accelerated erosion associated with human activities to continue. Soil stability and productivity would not increase until the vegetative cover is improved and additional disturbances are properly mitigated, reduced, or eliminated. Unnecessary rill and gully erosion would continue until linear disturbances (roads, pipelines) are stabilized through improved maintenance or closure and reclamation.

Accelerated erosion would continue and may have long-term adverse affects which would add to the sedimentation loading in the Green River. This would be nationally significant. Off-road vehicle use on the 60,000 acres limited to existing roads and trails, geophysical activities, and unauthorized off-road use would continue to create additional two-track trails and subsequent sources of erosion and sedimentation. Construction of facilities would remove vegetation and contribute to accelerated erosion. Wildfire and suppression activities could remove vegetation which would also contribute to the accelerated erosion.

Long-term adverse affects would occur to riparian values due to continued livestock grazing.

Natural geologic erosion would continue for both the short and long term and would be an unavoidable adverse impact.

White Mountain Petroglyphs ACEC

Closing the ACEC to surface disturbing activities, mineral material sales, mineral location, and the use of fire retardant chemicals would protect the petroglyph sites and allow educational uses.

Allowing activities such as explosives and blasting, and visual intrusions and disturbances on the ½ mile area surrounding the ACEC, could allow deterioration of ACEC values and values of concern to Native Americans. Unauthorized uses could damage petroglyphs and ACEC values.

Wild and Scenic Rivers

Developments within the Sweetwater River corridor could result in the loss of wild and scenic river values for the long term. This would not be an irretrievable loss of the resource.

Alternative A Summary

Important adverse impacts would continue to occur to vegetation, soil, and watershed resources. Riparian areas would decline in certain areas. Adverse impacts would occur to wildlife to the extent that animals would be displaced and populations could be reduced. Mineral production and rights-of-way construction would continue although surface constraints would increase the costs of doing business. Locatable mineral development would be severely limited due to the retention of withdrawals on about 3 million acres. Long-term adverse affects would occur to visual and recreation resources.

Opportunities for coal development could occur but would be limited due to about 18,900 acres that would be unsuitable and unacceptable for coal development activities.

ALTERNATIVE B

Assumptions

In addition to the Assumptions and Assessment Guidelines for all alternatives, these assumptions for lands and realty, livestock grazing, minerals, off-road vehicles, and socioeconomics specifically apply to Alternative B.

Lands and Realty

About 13,043 acres would be identified as possibly suitable for disposal through sale/exchange actions. About 31,020 acres are proposed for land acquisition which includes 640 acres for ACECs, 40 acres for cultural, 840 acres for riparian, 4,480 for state inholdings in WSAs, 3,040 acres for wild and scenic rivers, 3,380 acres for wildlife, 18,300 acres for watershed, and 300 acres for public access. The approximate acreage of additional withdrawals would be 34,699 acres.

Land Use Authorizations

During a 20-year period, an average of 100 permits, one lease, and 1,839 rights-of-way would be issued.

Table 4-14 shows the number and acres of authorizations over a 20-year period. Not all authorizations result in surface disturbance.

Estimated total acreage disturbed over a 20-year period is the same as the Preferred Alternative. It is estimated that there would be 9,158 acres plus 1,380 acres for mine start up (this does not include the 11,140 acres of road associated with oil, gas, and coalbed methane production shown under Oil and Gas and Coalbed Methane Assumptions).

Estimated total acreage reclaimed over a 20-year period is the same as the Preferred Alternative. It is estimated that there would be 7,000 acres (this does not include the 1,100 acres of oil and gas roads relinquished and reclaimed shown under Oil and Gas Assumptions).

Land would be provided for desert land entries or agricultural leases.

Withdrawal Revocation

Table 2-7 presents the withdrawals that would be revoked or retained for each alternative.

Livestock Grazing

About 290,000 acres would be treated by using prescribed burns to improve forage.

Intensive management of I and M allotments and implementation of rangeland improvements would allow 105,000 AUMs, currently in suspended non-use, to be reactivated. Ninety percent, or 94,500 AUMs would be reallocated to livestock while the other 10 percent would be reallocated to wildlife and/or wild horses.

Minerals

Coal Operations

It is reasonable to expect that current mining operations would continue, areas under lease or lease application would be developed, and areas having had expressions of interest for surface mining would be leased. Those areas that would continue to be mined or that have potential for surface disturbance from potential mining include Elk Butte (Beans Spring/PIO), Black Butte/Pit 22, Bridger, Cooper Ridge, Deadman Wash, Deer Butte, Lion Coal, and Pilot Butte. Table 4-30 shows the estimated amount of yearly production and total production from mining these areas. About 430.9 million tons of recoverable coal would be mined during this plan. The average yearly amount of disturbance would be about 740 acres with an average yearly production of about 17 million tons.

TABLE 4-30

ESTIMATED YEARLY COAL PRODUCTION BY TRACT AREA ALTERNATIVE B (million tons)

Year	Beans Spring	Black Butte/ Pit 22	Bridger	Cooper Ridge	Deadman Wash	Lion Coal	Pilot Butte	Total Production
1990[1]	0	5.8	5.8	0	0	0.11	0.19	11.90
1991	0	5.8	6.0	0	0	0.11	0.2	12.11
1992	0	5.8	6.0	0	0	0.10	0.5	12.4
1993	0	5.6	6.0	0	0	0.06	0.7	12.36
1994	0	5.8	5.9	0	0	0.05	3.9	15.65
1995	0	6.0	5.8	0.5	0	0.05	3.9	16.25
1996	0	6.0	5.9	0.8	0	0.05	4.0	16.75
1997	0	6.0	5.9	1.7	0	0.04	4.0	17.64
1998	0	5.8	6.0	2.0	0	0.03	4.2	18.03
1999	0	5.8	6.0	2.0	0	0.03	4.0	17.83
2000	0	5.7	6.0	2.0	0	0.02	3.9	17.62
2001	0	5.8	6.0	2.5	0	0.01	3.9	18.21
2002	0	6.0	5.8	2.5	0	0	3.9	18.2
2003	0	6.0	5.8	2.0	0	0	4.0	17.8
2004	0	5.9	5.8	2.0	0	0	4.0	17.7
2005	0.8	5.8	5.6	2.0	0	0	4.2	18.4
2006	1.2	5.8	5.5	1.0	0	0	4.0	18.1
2007	1.7	5.7	5.5	0	0	0	4.0	17.8
2008	2.0	5.6	5.3	0	0.5	0	4.2	19.3
2009	2.5	5.6	5.1	0	1.0	0	3.3	20.0
2010	2.5	5.5	5.1	0	1.5	0	0.7	18.3

[1] Actual production, base year

Oil and Gas and Coalbed Methane

Tables of Projected Drilling Activity and Associated Surface Disturbance were prepared for the planning area (Table 4-26), each of the 3 Special Study Areas (Tables 4-17, 4-27, and 4-19), and for coalbed methane (Table 4-28). Table 4-11 projects annual production rates of oil and gas through 2010.

Mining Law

The impacts would be the same as the Preferred Alternative. An oil shale withdrawal covers a large portion of the Green River and Washakie Basins within the planning area, prohibiting the location of mining claims. At some point, the oil shale withdrawal would be revoked. New mining claims would begin to be located in this area after revocation, especially for zeolite in the Washakie Basin.

It is assumed that demand for naturally occurring zeolite would increase, just as demand for naturally occurring sodium carbonate (trona) has increased. At least 1 mining operation for known zeolite deposits would be initiated. Such zeolite development would likely use the equipment and methods of a bentonite mine or a gravel pit, such as scrapers, dozers, belly dump trucks, etc. A zeolite mining operation would employ approximately 8 to 10 people mining 9 to 10 months of the year, at an annual rate of up to 100,000 tons. Table 4-21 projects the amount of surface disturbance associated with a hypothetical zeolite mine.

Off-Road Vehicles

1990 data shows that 342,550 visitor hours (28,546 visitor days) were spent in the planning area. It is anticipated that visitor use would increase by approximately 80 percent (4 percent/year) over 20 years due to an annual influx of people into the area from mineral development. This projection assumes that mineral development would increase. History has shown a boom and bust type situation for mineral development in the area.

Socioeconomics

Of the 413,147 AUMs of potential active preference under this alternative, the BLM would manage 95 percent (392,490 AUMs). Consequently, this is the level of AUMs that could be expected with certainty to be available to livestock in years with satisfactory range conditions. The remaining 20,657 AUMs that are managed by other public agencies (BOR and USFS) may or may not be allocated to livestock use over the next 20 years. However, it is assumed that all 413,147 AUMs could be recognized as the maximum active preference level and that these AUMs would be allocated to livestock use in years when range conditions permitted such an allocation and livestock owners requested the use of these AUMs. Potential actual use under Alternative B ranges from 180,000 AUMs to 413,147 AUMs, compared to a range of 180,000 AUMs to 200,000 AUMs under the Preferred Alternative, Alternative A, and Alternative C. However, even if proposed range improvements resulted under Alternative B, actual use would remain at the current level of 180,000 to 200,000 AUMs unless livestock owners requested additional use above current AUM levels.

Timber assumptions are the same as discussion in Alternative A.

Wild Horses

The impacts would the same as the Preferred Alternative. Fifteen water developments would be proposed in the Rock Springs Allotment primarily to enhance wild horse habitat (Appendix 9-4). Only controlled waters (i.e., wells) would be developed.

Impact Analysis

Air Quality

Coordination requirements and enforcement responsibilities would be the same as for Alternative A.

Because of the nature of the Bureau's responsibilities in air resource management, the policies and actions assumed for this alternative would produce few changes in the air resource management practices of the planning area. The emphasis of this alternative on production, particularly minerals production may require an increased effort at monitoring air quality in order to demonstrate that despite these increases, no air quality standards are being exceeded.

Increased production of minerals and livestock under this alternative would have a ignificant impact on the air resources themselves. As indicated by Table 4-22, minerals activities are the major BLM-administered programs which contribute to air quality degradation. Also, increased use of fire for vegetation treatment directly affects air quality. In dry years, grazing by livestock and off-road vehicle use can contribute to the increase in particulates in the air and subsequent reduction in visibility by exposing more disturbed surface to wind erosion.

Summary

Adverse impacts to users could occur because of restricted location for placement of facilities.

Surface mining, construction activity, road use, facility emissions, prescribed fire, and wildfire would affect air quality more than under the Preferred Alternative or Alternative A. Individual fires and construction activities have a short-term affect. Industrial emissions, dust from continued road use and surface mining, and vehicle emissions would be anticipated to occur at increased levels over the long term. Actual levels could not be determined. No irreversible irretrievable impacts would be expected.

Candidate Plant Species

Increased harvest of forest products would generally not impact candidate plant locations or potential habitat. Increased road construction to access forest resources could damage or remove candidate plants at actual locations and in potential habitat areas.

In order to restore and maintain 105,000 AUMs of suspended nonuse to active status, 290,000 acres would have to be burned and tremendous amounts of range improvement projects would have to be constructed. Management prescriptions, including no surface occupancy stipulations in actual candidate plant locations, would prevent impact to candidate plants due to construction of range improvement projects.

Increases in livestock numbers could cause range deterioration and force livestock to graze less palatable vegetation, including candidate plants. Increased grazing pressure could reduce or remove candidate plant populations in actual locations and potential habitat areas.

Under this alternative, actual candidate plant locations would be closed to ORV use, and off-road vehicle use in potential habitat areas would be limited to existing roads and trails; therefore, in theory, there would be no impact to candidate plants. But, unauthorized off-road vehicle use does and would continue to occur and could impact current populations and potential habitat areas. Dust from off-road vehicle use could settle on candidate plants in actual and potential habitat areas and limit photosynthetic processes.

Increased use of actual candidate plant locations and potential habitat areas for recreational activities such as camping, hiking, picnicking, ORV rallies, cross country races, and hill climbs could damage or remove candidate plants in actual and potential habitat areas.

Management of Highway 28 and the South Pass Historic Landscape area as a Class III area would allow more development and could impact candidate plants and potential habitat areas. No surface occupancy stipulations in candidate plant actual and potential habitat areas would negate impact due to the Class III designation.

Management actions described to protect air quality, cultural and paleontological resources, vegetation, watershed values, wilderness values, wildlife habitat, and wild and scenic rivers would generally have the same impact to candidate plant populations as described under Alternative A. Fire management activities, hazardous material management, lands and realty actions, mineral resources management, wild horse management activities, and other impacts would have the same impact to candidate plant populations as described under Alternative A.

Summary

Activities such as wildfire and related suppression activities, salting or areas where livestock concentrate, chemical control of noxious weeds, geophysical activity in actual and potential habitat areas, off-road vehicle use, increased recreation use, trampling by wild horses, closure or expansion of the McKinnon dump, and conversions of sheep to cattle all contribute to an irreversible irretrievable loss of the plant populations. Mining claim activity and unauthorized uses could create an unavoidable adverse impact and could result in an irretrievable loss of plant populations and habitat.

Cultural, Natural History, and Paleontology

These impacts would not generally be significant once steps outlined in Assumptions and Analysis Guidelines are followed. Disturbance with no mitigation would occur for some non-NRHP sites and very rarely on NRHP eligible sites.

The same Preferred Alternative benefits and impacts are projected for: management of cultural resources in Little Colorado Desert, North Nitchie Gulch, and Wamsutter Arch areas; land disposal; Fort LaClede; construction of well locations, pipelines, and access roads; zeolite mining; watershed conflicts, and wild and scenic river management.

The same Alternative A benefits and impacts are projected for: Steamboat Mountain and Boar's Tusk-Killpecker Sand Dunes area; development of coalbed methane; and allowing or not allowing geophysical vehicles and explosive charges.

Site specific cultural resource management plans on 15 trails (800 miles) and 9 sites would benefit cultural resources by targeting management and available budget.

Construction of linear rights-of-way could destroy approximately 100 sites.

No special cultural withdrawals would be made so no benefits to cultural management would accrue. Retention of 472 acres of cultural withdrawals would protect specific cultural values.

Strip mining and construction of surface support facilities could result in impacts to approximately 150 historic properties.

Opening new coal mining operations in Deadman Wash, Deer Butte, and Cooper Ridge would impact cultural resources. Densities of historic properties in these tracts are known to be relatively high. Results of Class II sampling surveys in the Cooper Ridge area indicate that site density could reach 3 times the area-wide average density, or about 10 sites per section. In the Deadman Wash and Deer Butte tracts, site density is likely to be twice the average density of 7 to 8 sites per section.

Some Class II sampling survey work done in the Beans Spring tract area indicates the density of cultural resources is somewhat less than the average across the planning area. However, significant sites should be expected especially in localized areas such as around springs. There are also known historic ranching operations in the area.

ORV closure or limitation to designated roads and trails on approximately 237,00 acres would lessen potential impacts to historic properties by lowering the potential for vehicular damage and unauthorized activities such as vandalism and looting.

Managing approximately 100 acres of Class II VRM would result in protection for significant rock art sites.

Summary

Increased surface disturbance activity would result in approximately 50 percent more conflicts than under the Preferred Alternative. Potential impacts to approximately 415 cultural resources would result form surface disturbing activities. Destruction of sites could result from scientific research and from data recovery mitigation efforts. While data recovery enhances our knowledge, it also destroys the resource. Targeted management efforts within cultural resource management plans would benefit and enhance cultural resources. If sites are not avoided, an irretrievable loss of the resource would occur.

Other actions providing long-term benefits to cultural management would be: acquisition of Fort LaClede, 472 acres of withdrawals, management of 100 acres as Class II VRM around significant rock art sites, closure or limitation of areas for off-road vehicle use, and closure of 28,602 acres to geophysical vehicles and explosive charges. Ten sites would be left unprotected and subject to destruction from vibration.

Not managing other values of Steamboat Mountain and Boar's Tusk-Killpecker Sand Dunes could allow deterioration of their value to Native Americans.

Information gained from research on archeological resources would provide valuable insight into past climates and human use of resources which could improve management of public lands.

Fire

Impacts are generally the same as those described for Alternative A.

Increased activities could add to the ignition potential, therefore, adding to the fire occurrence. Prescribed fire areas would be developed, allowing more fires to burn under specific environmental conditions and fire management criteria. Areas would be identified on drainage characteristics of the area.

Summary

Short- and long-term benefits would occur from reduced costs for wildfire suppression and prescribed fire activity, due to fewer imposed restrictions.

Forestry

Implementation of this alternative would result in all forested lands in the planning area being placed in a restricted management category. The forest lands would be managed to improve health, vigor, and stand diversity, while maintaining or enhancing other resource values. The projected annual sales quantity for this alternative of 1 million board feet would be a 1 percent reduction from the maximum output projected in the 1985 annual sale quantity computations for the Rock Springs District. In addition to the minimal reduction in the annual timber sale output, Alternative B would place a couple of operational restrictions on the commercial forest base.

Operational Restrictions

No timber management activities or firewood gathering would be allowed on an estimated 400 acres of commercial forest land within ¼ mile of potential wild and scenic river segments on the Sweetwater Rivers (see the forestry impacts section of the Preferred Alternative for a description of the acres affected by this restriction).

No surface disturbance would be allowed on roughly 150 acres of commercial forest land that occur within 500 feet of live water, floodplains, and/or riparian/wetland areas (excludes acres that fall within wild and scenic river restriction).

Clearcuts would be limited to a maximum of 25 acres.

No seasonal restrictions would be applied to this alternative.

Summary

The restrictions and volume reductions through this alternative would have minimal impact to the forest management program, the forest resources, and the local/regional forest-based economy. This alternative would give the manager the greatest degree of flexibility to improve the stagnating and declining conditions that occur in forest stands throughout the planning area.

Hazardous Materials

The impacts would be the same as the Preferred Alternative. Hazardous waste spills and unauthorized dumping on the public lands would be immediately cleaned up by BLM or the responsible party to reduce resource impacts. Lands would be inspected prior to transfer out of public ownership or prior to acquisition to protect the public from contact with hazardous materials.

Water resources would be protected by testing produced water pits or drilling fluid pits if they show indications of containing hazardous wastes.

Lands and Realty

Public land users would be impacted by 33,132 acres set aside for avoidance, exclusion, and no surface occupancy, and 260,020 acres with seasonal restrictions due to recreation, cultural, visual, wildlife, and other resource values. Approximately 5 percent of all rights-of-way would be impacted by these decisions (Table 2-4; Table 2-5; and Table 2-26).

The Cedar Canyon and White Mountain Petroglyph sites would be the only areas excluded and there would be no impact on rights-of-way. Rights-of-way in exclusion areas would not be allowed unless mandated by law.

Avoidance areas would have a small impact on rights-of-way except for those large areas within the Greater Sand Dunes ACEC (38,650 acres) and the South Pass Historic Landmark (5,260 acres). Although there is not much activity in the South Pass Historic Landmark and Greater Sand Dunes ACEC, any proposal to place facilities in these general areas may require major reroutes and extensive planning to limit impact to the resource values.

A total of 3,110 acres of actual candidate plant sites would be exclusion areas for rights-of-way. These small sites would not have an impact on right-of-way location. Candidate plant sites would be withdrawn which would preclude disposal or entry. On 38,600 acres of candidate plant habitat, searches would be required prior to construction which would impact the timing of construction of rights-of-way as these searches can occur only at certain times of he year.

Seasonal restrictions and other mitigation measures to protect resource values and threatened and endangered species (T&E) would impact placement of rights-of-way. Approximately 10 rights-of-way may have to be rerouted or mitigated annually to protect cultural/historical, wildlife, and T&E values. Crucial wildlife habitat would impact the location of rights-of-way construction. Wetland/riparian areas and floodplains also would impact the location of rights-of-way. Coal development would remove or require realignment of facilities in the east-west window between Rock Springs and Point of Rocks. Relocation and costs of realignment would be adverse to users, as no area immediately adjacent would be available for placement of these facilities.

The possibility of high dust levels resulting from use of unpaved access roads would necessitate stipulations to control dust. All construction rights-of-way as well as access road rights-of-way would include a stipulation requiring that the holder meet Federal and State air quality standards.

Land tenure adjustments would occur only if the benefits outweigh any adverse impacts, and if there are no significant impacts which cannot be mitigated. A total of 13,043 acres have been identified as possibly suitable for disposal (Appendix 8-1). The ability to sell/exchange land and to issue Recreation and Public Purpose Leases and patents would benefit communities and industry.

The sale or exchange of isolated tracts would result in the disposal of lands that are difficult to manage. Based upon past experience, it is anticipated that 3,000 acres would be sold, exchanged, or patented under the Recreation and Public Purposes Act during the next 20 years. Sale or exchange of lands may be necessary to accommodate the need for hazardous material or solid waste disposal sites. All lands must have a hazardous waste clearance prior to disposal which would increase the cost to the proponent or to the Bureau.

Existing withdrawals would be reviewed, and those which no longer serve the purpose for which they were withdrawn would be revoked. These lands, encompassing nearly 90 percent of the planning area, would then be open for entry, disposal, and mineral location. By revoking the withdrawals, it is possible that there may be a rush to file mining claims (Table 2-7).

The withdrawal of 34,699 acres of lands within ACECs and other special management areas would preclude disposal, entry, and mineral location (Table 2-6).

As part of the federal program to reduce the salinity and sedimentation of the Green River Basin, desert land entries or agricultural leases would be authorized only if such use meets the soils/water and Department of Agriculture criteria. This would have slight impact as little of the planning area meets the criteria for desert entry.

The acquisition of access would be required to protect and promote resource values (ACECs, recreation, timber and mineral sales, access to BLM improvements, etc.) (Table 2-8).

Summary

The majority of rights-of-way require short-term use of lands; long-term productivity is restored upon rehabilitation. The addition of two new rights-of-way windows would concentrate activities and reduce disturbance. Unavoidable adverse impacts could occur to rights-of-way management because of constraints for resource protection that impact the routes selected and the timing of construction. The greatest impact would be in those areas which would be managed as no surface occupancy areas and are listed as avoidance or exclusion areas for rights-of-way.

Approximately 3 million acres of withdrawals would be revoked which would enable additional lands to be sold, exchanged, or claimed. The approximately 34,700 acres to be withdrawn would be unavailable for mineral entry, causing a long-term-loss of productivity of locatable mineral resources. This loss would be minimal compared to Alternative A.

Lands would be irreversibly lost to the public land base when sold or exchanged (about 13,000 acres). Under exchange, however, lands of comparable value would be obtained. Lands currently authorized as landfill sites or ndustrial ponds would be irretrievably committed to compatible uses. For example, landfill sites are susceptible to subsidence and methane gas leakage; therefore, any later surface construction must take these potential problems into account. The impacts of railroad rights-of-way or any rights-of-way requiring large amounts of earthwork may be irretrievable due to cost and complexity of rehabilitation.

Livestock Grazing

The management actions described for this alternative would generally benefit livestock grazing. Land treatments would take place on approximately 290,000 acres. This action would create areas for grazing of livestock in management systems and provide opportunities for resting riparian habitat from grazing thus improving ecological condition classes. Condition class improvement would be realized in 20 years.

The range improvements proposed in Alternative A (Appendix 9-4) serve as a base for this alternative as well. Many of the "M" category allotments currently have AMPs that are fully functional when grazed with permitted livestock numbers, even though current operations are grazing livestock at a level one third or one half of capacity. The area currently has 810 range improvements including pits, reservoirs, wells, fences, and various other projects. The "M" category allotments would have current AMP objectives altered in order to increase carrying capacity and develop or change grazing systems. Expected AUM loss due to new project construction would be 8 AUMs, in addition to 92 AUMs already out of production due to past project construction.

The 15,100 acres of unallotted forage would be allocated to livestock after lands have been evaluated. A benefit to individual permits could be realized as 1,250 AUMs would be added to the planning area active preference.

Water developments would be implemented primarily for livestock benefit and would be allowed in crucial wildlife winter ranges.

Under this alternative, livestock grazing would be permitted in the 970-acre Palmer Draw area under an Allotment Management Plan. Approximately 81 AUMs would become available for livestock use.

Long-term benefits would occur for completion and implementation of 42 AMPs on about 60 percent of the planning area.

Existing lands, minerals, wild horse, range, and wildlife actions have removed roughly 3,346 AUMs of livestock forage from surface disturbing activities. Management actions proposed over the next 20 years would remove forage from an additional 69,723 acres. In total, forage production would be affected on 110,515 acres. During the next 20 years, roughly 49,958 acres would be reclaimed. After reclamation, an estimated 60,557 would still be out of forage production. The forage loss associated with the unreclaimed lands would be 5,052 AUMs. Table 4-31 show the losses by disturbance category.

Some individual livestock operations could be directly affected by lands and minerals actions especially in the Rock Springs and Eighteen-Mile allotments.

No immediate change in permitted active preference would be proposed under this alternative. However, as data is gathered and existing monitoring data is evaluated, changes could be necessary.

Avoidance of significant cultural sites, limitations on activities within ¼ mile of historic trails, and subordination of activities to historic landscape values in some areas may constrain the BLM's ability to construct rangeland improvements aimed at achieving better distribution of livestock. Added survey and design costs may be necessary to avoid effects to cultural resources.

A proposed land exchange within the boundaries of the Fourth of July allotment would not cause any known impact to management of livestock.

There are 9 allotments (384,000 acres) that could be affected by surface disturbance during the lambing period of May 1 to June 15. This disturbance could possibly cause a disruption of lambing which could cause death or bumming of the new born lambs. The nine allotments are Lombard, Highway Gasson, Big Sandy, Sublette, Boundary, Poston, Reservoir, Prospect Mountain, and Little Prospect.

There would be no known impact to livestock grazing management due to management actions described for candidate plant locations.

Loss of vegetation and associated AUMs and possible harassment of livestock could be expected due to off-road vehicle use, off-road rallies, cross country races, and hill climbs.

Competition for forage between livestock and wildlife would continue to exist in some areas, particularly where current wildlife populations exceed strategic plan numbers.

There would be no known impacts or conflicts to livestock grazing management due to management actions described for the White Mountain Petroglyphs or Red Creek ACECs.

If the Pine Springs, Natural Corrals, Greater Sand Dunes, and Cedar Canyon ACECs were opened to mineral sales or leasing, loss of forage could occur due to surface disturbance.

An impact to livestock grazing management could arise due to the 50 percent utilization level in the Greater Sand Dunes ACEC. This level is not a current objective of the Sands AMP or the Rock Springs allotment. The Sand Dunes AMP would have to be modified to support this action. Utilization levels would have to be imposed in the sand dunes area of the Rock Springs Allotment.

No surface occupancy stipulations in the Oregon Buttes ACEC could effect future rangeland project construction needed for management of livestock in order to achieve management objectives of AMPs.

The 3,110 acres of no surface occupancy stipulations in candidate plant locations would not affect future rangeland development or livestock management.

Summary

Losses of livestock forage would occur due to mineral development activities, lands actions, and other disturbances affecting approximately 5,052 AUMs. Prescribed burning on 290,000 acres and wildfire would have a short-term impact on forage but should result in long-term productivity of forage.

A reduction in no surface occupancy requirements would allow project placement and development aimed at improving livestock distribution in more areas. This would have a long-term beneficial affect and livestock distribution problems would be reduced for both the short term and long term. Some problems would continue in the long term in localized areas.

Surface disturbance on 9 allotments (384,000 acres) could disrupt lambing. Land disposals affecting approximately 1,087 AUMs, would be considered an irreversible irretrievable loss of forage.

TABLE 4-31

LIVESTOCK FORAGE/AUM LOSSES (ALTERNATIVE B)

Activity	Existing Disturbed Acres	Projected Disturbed Acres	Total Disturbed Acres	Reclaim ed Acres	Net Disturbed Acres	AUMs Lost
Lands Actions						
Disposal	2,783	13,043	15,826	NA	15,826	1,319
Authorizations (R/Ws, permits, leases)	8,325[1]	10,538	18,863	7,000	11,863	989
Wild Horse						
Trap sites	62	30	92	0	92	8
Water development	0	15	15	0	15	1
Range Improvements						
Wells, pits, reservoirs	810	77	887	0	887	74
Wildlife						
Guzzlers	10	0	10	0	10	4
Exclosures	930	0	930	0	930	78
Mineral						
Oil and gas	10,809	26,865	37,674	22,139	15,535	1,296
Gravel pits	1,080[2]	—	1,080	—	1,080	90
Coalbed methane	140	3,640	3,780	2,329	1,451	121
Coal (6 mines)	13,918	15,190	29,108	18,490	10,618	885
Mine Sites (trona, jadeite, zeolite, gold)	1,920	325	2,245	0	2,245	187
Sodium wells	5	0	5	0	5	<1
Total	**40,792**	**69,723**	**110,515**	**49,958**	**60,557**	**5,052**

[1] Based on Resource Area estimates. Actual disturbance due to lands actions is not presently known (Haverly).

[2] Based on Resource Area estimates. Actual acreage of gravel pits is not known. It is estimated that the amount of disturbance will remain constant (i.e., new acres disturbed would be offset by acres reclaimed) (Porter).

Minerals

Oil and Gas

Table 2-26 shows acres of ownership and development potential for each of the three types of lease restriction. The application of a no leasing restriction would remove 243,940 acres from potential opportunities for the exploration and/or development of oil and gas resources. Approximately 147,200 of these acres have high development potential, while 18,400 acres have moderate potential, and 79,890 acres have low development potential. These no leasing restrictions represent an approximate 20,830-acre decrease in planning area lands covered by this restriction compared to Alternative A. This would decrease the impact on oil and gas activities over existing management and result in more wells being drilled.

The application of no surface occupancy stipulations would affect 23,482 acres of land with high development potential, while 5,300 acres of moderate potential and 4,380 acres of low potential would be affected. These restrictions represent an approximate 147,338-acre decrease in planning area lands covered by this type of restriction compared to Alternative A. The effect of adding this stipulation to a lease would result in adding to the potential costs of drilling exploration and development wells by requiring relocation of well sites outside the restricted area and in some cases requiring the additional expense of pursuing directional drilling to access a reservoir. Also, in some parts of the planning area, the cost of drilling a directional well would be so high that wells would not be drilled because of economic considerations. In addition, the amount of land with a no surface occupancy stipulation, in some locations, would cover such a large area that companies would not have the technical ability to be able to drill wells to access areas in the middle.

The application of the no surface occupancy stipulation to leases would affect 207,160 acres of land with high development potential, while 42,040 acres of moderate potential and 46,830 acres of low potential would be affected. These restrictions represent an approximate 2,207,980-acre decrease in planning area lands covered by this type of restriction compared to Alternative A. The affect of adding this stipulation to a lease would result in reducing the amount of time that exploration, development, and production activities can occur in each year. Activity would be concentrated into shorter time periods, increasing costs to those developing the resource.

Surface disturbance stipulations placed on each oil and gas lease issued in the listed areas would affect 393,290 acres of land with high development potential, while 184,310 acres of moderate potential and 322,490 acres of low potential would be affected. These surface disturbance restrictions represent an approximate 208,010-acre decrease in lands covered by this type of restriction compared to Alternative A. The affect of adding this type of stipulation to leases results in increased costs of drilling to mitigate impacts or relocating to avoid the restriction. In some cases, the cost of mitigation would be so high that the development activity would no longer be economic to pursue.

Generally, there are fewer restrictions to oil and gas activity under this alternative. As a result, opportunities to allow additional activity would generally be increased.

Restrictions in the area of high coalbed methane development potential would have the same impacts as for oil and gas development.

The cost of geophysical activities would also be increased, with some activities being limited to certain times of the year or displaced from areas of conflict with other resource values. In some parts of the planning area, restrictions would limit the amount of seismic work that can be performed so that complete analysis of the potential resource would not be available before drilling activity occurs.

Coal

If the projected coal mines are not allowed under this alternative, royalty would be lost to the state government, federal government, and the local area economy.

Impacts to the coal program occur from wildlife areas that are removed from mineral development or restrictions placed on mining operations such as no surface occupancy or mining limited to underground operations. Cultural resources would inhibit mining where significant prehistoric and historic sites and sites of religious or spiritual concern to native americans are identified; coal would be excluded from surface occupancy or surface mining, and underground mining would be excluded in some areas. Cost of mitigation in avoidance of these resource issues may leave coal unmined; thus, the coal resource is forever lost as it becomes uneconomic to mine as isolated coal zones.

Visual, air, and water resources would impact coal development by increased costs in mitigation. Wetland areas would be managed to enhance other resource values, also increasing coal development costs or leaving isolated unmined coal. These costs would be passed on to consumers of the coal resource.

Surface coal mining would be prohibited in WSAs and some ACECs. The coal resources within these areas would be lost to the nation's energy needs if subsurface mining is not feasible.

Sodium/Trona

Impacts to sodium would be from air, water, and visual resources. These resource objectives would often increase the cost of sodium development and may inhibit further development in the northern known sodium leasing area.

Locatables

Approximately 34,699 additional acres would be withdrawn. These lands would be unavailable for mineral location.

Approximately 104,700 acres within existing ACECs would require a Plan of Operations for any activities other than casual use. These lands may overlap the existing and proposed withdrawals listed above.

About 3 million acres of existing withdrawals would be revoked, and would become available for mineral location which would result in a benefit to mineral location activities.

Impacts from management in the South Pass Area would be the same as Alternative A.

Mineral Materials

Opportunities for sales would be lost on about 32,842 acres (see Table 2-13). This is a small portion of the planning area and should not significantly affect the availability of mineral materials area wide.

Areas of permanent or seasonal no surface occupancy are the same as those listed in Table 2-26. This table also lists areas where no surface disturbance would be allowed. These no surface occupancy and no surface disturbance restrictions would adversely impact the use of mineral materials. While mineral material disposals may not actually be prohibited in these areas, it is impractical to remove mineral materials from these areas without disturbing or occupying the surface in the process. Mitigation measures would increase the costs of doing business, limit timing of activities, and may preclude some activities.

Sales or disposals of mineral materials from established sites (i.e., community pits and other disposal sites) would eventually deplete these same sites and require the establishment of other sites to replace them. The establishment of moss rock common use areas implies that the moss rock within such areas would also be depleted as a non-renewable resource. The same is true for topsoil in any topsoil community pits established under this alternative.

Summary

Oil and Gas

Short-term and long-term effects would occur to mineral production and management through closure of 242,590 acres to leasing. No surface occupancy requirements and restrictions on surface disturbance would increase the costs of doing business and possibly preclude some activities. However, this impact would be greatly reduced from Alternative A.

Approximately 624.7 billion cubic feet of gas and 16.6 million barrels of oil would be produced between 1991 through 2010. This production would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Coal

Short-term and long-term effects would occur to coal leasing and development due to approximately 12,600 acres determined unsuitable for leasing, 39,232 acres unacceptable for surface mining operations but available for subsurface mining, 3,810 acres of limited surface facilities, and 135,800 acres subject to further mitigation and/or consultation. Increased costs of mitigation would have short- and long-term effects on coal production activities by increasing costs and limiting timing of development, but this impact would be reduced from Alternative A.

Approximately 340.45 million tons would be produced, which would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Sodium/Trona

Long-term benefits would occur, with the entire area being open to leasing. However, short- and long-term affects would occur through increased costs of mitigation.

Approximately 115 million tons of trona would be produced from within the planning area over the next 20 years which would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Mineral Materials

Costs of mitigation (about 33,000 acres of no surface occupancy and 32,842 acres closed to salable minerals) would decrease resulting in reduced costs of doing business in both the short and long term. Some unauthorized use would continue. Materials sold would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Locatable Minerals

Withdrawals on approximately 3 million acres would be revoked, resulting in a long-term beneficial effect to the development of locatable minerals. Additional requirements and mitigation for ACECs would increase costs of doing business for both short- and long-term periods.

Geophysical

Areas closed to geophysical activity result in a loss of data through the long term and would be an unavoidable adverse impact. Costs for mitigation would affect operations in both the short and long term. Constraints on geophysical activity in developed and semi-developed recreation sites would limit the ability to obtain data. ORV prescriptions would be reduced providing a greater benefit. Areas open to vehicle use and exploration activity provide beneficial long-term effects because retrieval of information is allowed.

Off-Road Vehicles

Off-road vehicle use in the Sand Dunes "open" area would be allowed on 5,500 acres. About 3,412,920 acres or almost 95 percent of the planning area would be limited to existing roads and trails; 1,320 acres would be limited to designated roads and trails; 184,950 acres (about 5 percent of the planning area) would be closed to vehicle use; and 890 acres of existing and designated roads and trails would fall under seasonal closures (see Table 4-24). Areas restricted by seasonal closures would be reduced greatly over Alternative A, however, closures would increase slightly.

Because of additional producing wells associated with oil and gas production in the Greater Sand Dunes ACEC, the public would have a reduced "open" area to play in. They would be restricted to existing roads and trails. However, concerns over safety would be reduced over Alternative A.

Reducing ORV open acreage in the planning area would have an adverse impact to this resource. Less than 1 percent of the area would be designated "open" and any further reduction would displace more users. The implementation of the limited to existing roads and trails designation for public lands in the remainder of the area may pose conflicts in some areas; however, the density of existing roads and two-track trails would provide access to essentially all of this area. The condition in the limitation definition which allows off-road use for "necessary tasks" (e.g., livestock management) essentially would allow for existing uses to continue.

The following areas would be partially closed or closed all together from off-road vehicle travel which displaces users: Candidate Plant areas, Natural Corrals ACEC, Oregon Buttes ACEC, Pine Springs Expansion Area, and Red Creek ACEC (see Table 2-28). However, this amounts to less than 1 percent of public lands in the entire planning area and would not be considered a significant impact.

Summary

Reducing ORV open acreage to 5,500 acres and increasing development in that same area would reduce useability due to associated hazards. This would result in a long-term adverse impact for off-road vehicle use. However, long-term benefits would occur from the reduction in seasonal constraints and the large amount of area limited to existing roads and trails.

Recreation

Impacts to cultural resources would be the same as for Alternative A.

The forest management actions proposed would have an adverse impact on recreation because these actions would have adverse impacts on wildlife populations. The identified decline in wildlife populations would result in a loss of hunter days, which is a loss of recreation use and opportunity.

The granting of rights-of-way would adversely affect recreation areas such as developed sites. This would result in the loss of some existing and potential recreation resources.

Allowing livestock to graze in all developed and semi-developed recreation sites would adversely impact the recreation experience.

Managing riparian areas to emphasize livestock forage would result in the loss of valuable wildlife habitat upon which much of the recreation use is based.

The implementation of the proposed additional limitations on off-road vehicle use would not have a significant impact on the current recreational use in these areas.

Developing backcountry byways provides opportunities to interpret diverse resources.

The development of additional sites would benefit the recreation program by providing for current needs and increased use. Not allowing disturbance within one-quarter mile is necessary to protect these sites from other developments.

A no surface disturbance stipulation within ¼ mile of recreation sites unless the activities are determined to be compatible with recreation objectives would benefit the high quality recreation values in the area. There are 6 developed, 5 semi-developed, and 14 undeveloped sites which would be protected by this stipulation.

Camping adjacent to crucial wildlife and livestock waters would ensure popular recreation sites would remain available.

The camping limit of 14 days within a 5-mile radius may inconvenience some users. The limit would help to maintain the quality of the planning area for recreation. Permitting camping in riparian areas and ear crucial wildlife and livestock waters would allow users to continue to use traditional sites.

Provision of areas for ORV rallies, cross-country races, and hill climbs would enhance opportunities for recreation users, but may result in resource damage.

Special recreation permits and the accompanying mitigation would assure resource protection and public safety.

Implementation of management plans for the Sand Dunes, Oregon and Mormon Pioneer Trails, the Green River, and the Wind River Front would benefit the recreation user. Recreation would also be enhanced by recreation project plans, a wild horse viewing area, protection of the integrity of the Continental Divide Snowmobile Trail, establishment of the Green River "greenbelt," development of recreation sites, and protection of Boar's Tusk, Pilot Butte, and Emmons Cone.

The lowering of the visual management classes would have minor adverse impacts to the recreation program by allowing for development activities to occur in areas where they are currently considered incompatible. Specific recreation sites within these areas would, however, have their visual integrity protected and would not be impacted.

The application of stipulations to protect wildlife would also benefit recreation because the most popular recreational uses in the area (hunting and fishing) are directly tied to wildlife resources. The identified protection of crucial big game winter ranges and sage grouse strutting grounds is essential to the protection of the wildlife populations upon which much of the recreation use in the area is based.

The management of wildlife populations below current levels would have a compounding adverse impact on the recreation uses of the area. A lower wildlife population would in turn result in a lower recreation potential for hunters and anglers. The quantity as well as the quality of the recreation experience in the Green River planning area would decline.

Dispersed recreation activities such as hiking, picnicking, and hunting would be allowed in Special Management Areas.

Summary

It is anticipated that non-consumptive recreation (sightseeing, hiking, etc.) would increase by 80 percent and consumptive recreation (hunting, off-road vehicle use, etc.) would increase by 40 percent over 20 years due to increased mineral development and resource restrictions.

Short-term benefits would occur for recreation users due to increased development of recreation sites. However, this would be offset in the long term due to mineral development activities increasing and displacing users, concentrating recreation use in other areas.

Disruption of recreation opportunities in areas of development would occur both over the short and long term. This would be important to the local user but probably not nationally significant.

Socioeconomics

Related socioeconomic tables are located in Appendix 10. Other economic tables, graphs, and charts used for this analysis are on file at the BLM Green River Resource Area in Rock Springs, Wyoming.

Livestock

Annual Perspective

There is the potential for total active preference for livestock use to rise from the current level of 318,647 AUMs to 413,147 AUMs per year. This increase could result if the current 105,000 AUMs of annual suspended non-use were improved by range treatment activities to a condition that permitted 90 percent (94,500 AUMs) of it to be made available for livestock use.

The analysis of the 180,000 to 200,000 AUM range of actual use would be the same for this alternative as for the other Preferred Alternative. Therefore, the following analysis deals only with a hypothetical 413,147 AUM use level, compared to a hypothetical use of the current total active preference level of 318,647 AUMs.

If an actual use level of 413,147 AUMs is assumed, it would return about $773,205 in annual grazing fees to the BLM. This is $176,857 higher than is returned under active preference of the Preferred Alternative.

Direct personal income realized by the Area livestock sector annually from this level of AUM use is estimated to be close to $3.5 million, about $0.75 million more than would be realized from active preference use under the Preferred Alternative. The subsequent impact on the Area's total (direct, indirect, and induced) personal income from active preference would amount to over $12 million, about $2.8 million higher than like income under the Preferred Alternative.

If total actual use reached 413,147 AUMs per year the annual direct output value of the livestock sector is estimated to amount to almost $25 million, about $5.4 million more than under the Preferred Alternative. This would contribute over $69 million in total (direct, indirect, and induced) output to the Area economy and tops the estimated maximum contribution possible under the Preferred Alternative by about $16.0 million.

Direct annual employment by the livestock sector at active preference would be about 480 FTEs, 110 FTEs higher than would be possible under the Preferred Alternative. Annual benefits to the Area's total annual employment numbers would amount to an estimated 1,017 FTEs, about 232 FTEs above that of the Preferred Alternative.

Summary

Over the next 20 years, implementation of Alternative B would result in the following cumulative impacts:

AFFECTED ITEMS	USE LEVEL 413,147 AUMs	INCREASE OVER PREFERRED ALTERNATIVE, ALTERNATIVE A, and ALTERNATIVE C[1]
Grazing Fees To BLM (million $)	16	4
Direct Personal Income (million $)	71	16
Total Area Personal Income (million $)	249	57
Direct Output (million $)	488	112
Total Area Output (million $)	1,381	316

[1] The figures in this column are the result of comparing the totals in the previous column of this table to 20-year totals for the same items in the Preferred Alternative, at the 318,647 AUM use level. Figures are rounded to the nearest whole number.

Recreation

Comparing 2010 to 1990 and Alternative A

Recreation days are projected to rise by about 1,917 days each year over the next 20 years. Subsequently, by the year 2010, the estimated annual level of recreation days would total 115,654, which is 38,337 days higher than the 1990 level (which would also be the 2010 level under Alternative A). This results in an estimated annual value for direct recreation expenditures in 2010 of over $7.8 million, about $2.4 million higher than in 1990 or under Alternative A. This translates in to a benefit to the Area's total, annual economic output of almost $16.10 million, which is about $4.95 million more than benefits under Alternative A.

This alternative also results in approximately $2.61 million of direct annual recreation sector income, about $800,000 more than with Alternative A. Total (direct, indirect, and induced) annual area income under this alternative would be increased by almost $4.05 million from area recreation. This is close to $1.25 million more each year than expected under Alternative A.

The number of workers directly employed in Area recreation (304 FTEs) in year 2010 would be about 95 FTEs higher than would be estimated for Alternative A. Also, recreation would produce approximately 422 FTEs of total (direct, indirect, and induced) annual employment in the area in 2010, about 132 FTEs more than Alternative A.

Summary

The total direct cumulative user expenditures for recreation would amount to over $133.8 million, about $25.28 million more than the cumulative direct expenditures under Alternative A. This would result in almost $274.91 million of additional total (direct, indirect, and induced) cumulative economic output in the Area by 2010, about $51.94 million above Alternative A.

Direct cumulative recreation sector income (almost $44.65 million) is estimated to be over $8.4 million higher than under Alternative A. Total cumulative area income (direct, indirect, and induced) resulting from recreation activities (almost $69.17 million) would top that generated by Alternative A by almost $13.07 million.

Timber

Impacts are the same as those addressed in Alternative A.

Sodium/Trona

Impacts are the same as those addressed in the Preferred Alternative.

Oil and Gas

Annual Perspective

Of the four alternatives considered in this RMP, Alternative B has the highest output of oil and gas and, subsequently, the highest related output, income, and employment values.

Direct output trends upward for both oil and gas until year 2009 when it reaches a peak level of 945,648 barrels for oil and 35.58 billion cubic feet for gas. In 2010, these levels decline to 921,768 barrels for oil and 34.68 billion cubic feet for gas. Direct output values for oil and gas are projected at about $18.9 million for oil and $35.6 million for gas in 2009, declining to about $18.4 million and $34.7 million, respectively, in 2010.

In the peak year 2009, benefits to total area output as the result of oil output is estimated to amount to almost $28.5 million and benefits from gas output would add almost $53.6 million more. In 2010, these benefits are expected to decline to about $27.8 million and $52.2 million, respectively.

Direct income from oil and gas activities under Alternative B could total almost $1.6 million and over $2.9 million, respectively, in 2009. In 2010, these levels are expected to drop to slightly over $1.5 million and $2.8 million, respectively. Benefits to total area income from oil and gas activities in 2009 could amount to almost $3.2 million from oil and $6.0 million from gas. These benefits are projected to decline to about $3.0 million and $5.8 million, respectively, in 2010.

Peak annual employment would be reached in 2009 at 725 direct FTEs in the oil/gas sector and 2,511 FTEs of total area employment resulting from oil/gas activities. By 2010, these totals are projected to drop to 713 and 2,469, respectively.

Summary

Over the 20 years (1991-2010), Alternative B is expected to produce 16,603,366 barrels of oil and 624.71 billion cubic feet of gas, valued at approximately $332.1 million and $624.7 million, respectively. Total area output is estimated to benefit by over $500 million from oil activities and by almost $940.9 million from gas output during this time period.

Direct income effects are projected to amount to over $27.2 million from oil and almost $51.3 million from gas activities over the 20 years. Subsequently, total area income would increase by almost $55.6 million from oil production and almost $104.6 million from gas output.

Coal

Annual Perspective

The base year (1990) figures would be the same as under the other alternatives, about 11.9 million tons, valued at about $212 million.

The peak output year is 2009 when annual output reaches an estimated 20 million tons, valued at over $356 million. At that time, 6 mines are projected to be on line. These include Elk Butte (Beans Spring/PIO), Black Butte, Bridger, Cooper Ridge, Deer Butte, and Pilot Butte. Both Deadman Wash and Lion Coal mines are projected to be off line before 2009. By 2010, annual production is projected at only about 18.3 million tons, valued at about $326 million.

Total annual area output (direct, indirect, and induced) in 2009 is expected to benefit by almost $640 million from coal production that year. This benefit would amount to about $585 million in 2010.

Direct personal income to area coal sector households in 2009 is estimated to approach $64 million. Additional indirect and induced benefits to total area personal income from coal activities that year are estimated to surpass $51 million, resulting in total benefits to area personal income of about $115 million. By 2010, direct benefits to personal income of coal sector households are projected to be about $58 million and total benefits to area income about $105 million.

Direct annual employment by the resource area coal sector in 2009 is projected at 1,446 FTEs but this could rise to 1,564 FTEs by 2010. The benefit to total area employment (direct, indirect, and induced) could rise by 3,761 FTEs in 2009 and 4,068 FTEs in 2010 as the result of coal production activities in the resource area in those years.

Summary

Cumulative coal output over the 20 years is estimated at almost 340 million tons, 15 million tons above the Preferred Alternative or Alternative A. The cumulative value of output is thought to be close to $6.1 billion, $278 million above the Preferred Alternative or Alternative A.

Total area output (direct, indirect, and induced) could rise by almost $10.9 billion over the 20 years as the result of all the coal activity during that time period. This is about $499 million higher than under the Preferred Alternative or Alternative A.

Direct area income to coal sector households could amount to close to $1.1 billion for the 20 years, up $50 million over either the Preferred Alternative or Alternative A. Total area household income could rise by almost $2 billion during the 20 years as the result of resource area coal activities, up $90 million over the Preferred Alternative or Alternative A.

Coalbed Methane

Impacts are the same as those addressed in Alternative A.

Vegetation

Prescribed burning would cause a long-term decrease in shrub species, a short-term increase in annual weeds, and a long-term increase in grass species on 290,000 acres. Total forage production would decline for about the first two growing seasons following a prescribed burn. After the second year, livestock and certain big game (elk) forage would increase, and range condition and forage production would improve in the third year after a burn. Prescribed burns in decadent aspen stands would, with proper grazing management, stimulate sprouting and reproduction of aspen and alter age classes structure. Other impacts from prescribed burns and fire management are the same as those described for the Preferred Alternative.

Under this alternative, forestry management actions (harvest of 1,000,000 board feet from 7,943 acres) on commercial stands and noncommercial stands would reduce age class and plant species diversity. Construction of additional access roads to timber sales would remove vegetation for a period of approximately 10 years unless the road is used by the public, in which case vegetation would be permanently removed. Management actions on woodland forests (127,977 acres) would remove vegetation from significant areas. Areas that are currently limber pine or juniper covered would be converted to shrub/grass communities over time although re-establishment of juniper could be expected. Construction of additional access roads to woodland stands would remove vegetation for a period of approximately 10 years unless the road is used by the public, in which case vegetation would be permanently removed.

With the exception of desert land entries, most of the impacts to vegetation from lands and realty actions are covered under the impacts to livestock grazing in terms of AUMs lost. The possible sale of public lands under this alternative would have no significant adverse effects on vegetative resources. No significant rare plants are known to exist on lands identified as potentially suitable for disposal. Any significant vegetative resources on these lands would probably be discovered in site specific investigations that would be conducted during evaluation of sale proposals. In such cases, effects on vegetation would be mitigated by appropriate wording in the patent, or the sale would be denied if necessary. No significant adverse impacts would be expected under this alternative from termination of identified withdrawals.

The impacts to vegetation due to desert land entries are identical to the impacts addressed under the Preferred Alternative.

In order to restore 105,000 AUMs of suspended nonuse to active status, 290,000 acres would have to be burned. See Alternative A for impacts associated with prescribed burns. Rangeland project (wells, reservoirs, pipelines, fences, etc.) construction and implementation would remove vegetation from 105 acres. Impacts to vegetation due to project construction are the same as those described for the Preferred Alternative. Activation of 105,000 AUMs of suspended nonuse to active status without additional project construction to better distribute livestock would result in severe overgrazing and a significant downward trend in range condition.

Allowing grazing in areas currently not available to grazing (Palmer Draw, recreation sites, unallotted acreage) would cause greater utilization of forage. Increased utilization could result in species composition changes or a decrease in vegetative production and vigor.

Grazing levels at active preference of 318,641 AUMs and wildlife numbers as described in the 1989 strategic plan with no grazing preference adjustment to support wildlife could result in lowered vigor and possible removal of vegetation necessary to support wildlife numbers. Severe overgrazing could occur and over utilization of riparian and upland areas would be prevalent.

Impacts to vegetation from minerals activity are generally expressed in terms of AUMs lost or temporarily removed pending reclamation. Construction of drill pads, roads, facilities, pipelines, powerlines, and other structures associated with oil and gas operations would result in loss or removal of vegetation from 37,674 acres over the next 20 years. Reclamation of disturbed sites would be accomplished on about 22,139 acres; therefore, total net loss of vegetation would be approximately 15,535 acres over the next 20 years.

Activities associated with coalbed methane projects would be expected to remove vegetation from acreage similar to those described for Alternative A (see Alternative A Impacts).

Coal mining activity at the Bridger, Black Butte, Stansbury, Lion, Cooper Ridge, Deer Butte, Deadman Wash, and Elk Butte (Beans Spring) mines would be expected to remove vegetation from 29,130 acres over the next 20 years. Reclamation of disturbed sites would be accomplished on about 18,210 acres; therefore, total net loss of vegetation would be approximately 10,920 acres over the next 20 years.

Approximately 325 acres of vegetation would be disturbed by activities associated with mining of other leasable solids (trona and phosphates) and locatable minerals over the next 20 years. Reclamation of disturbed sites would be accomplished on about 306 acres; therefore, total net loss of vegetation could be expected on about 19 acres over the next 20 years.

Impacts to vegetation resources from management actions described for wildlife, air quality, cultural and paleontological resources, off-road vehicle use, candidate plants, recreation, visual resources, watershed management, wilderness, and wild and scenic rivers are the same as described for Alternative A.

Development of 15 wells for wild horses would remove vegetation from approximately 23 acres. Redistributing horses with water developments would cause grazing to take place in areas not presently grazed by wild horses. Such use could cause a downward trend in range condition or alter existing vegetative communities.

Other effects on vegetative resources from management actions associated with wild horses are generally the same as described for Alternative A.

Summary

There would be a short-term increase of annual weeds and a short-term decrease in vegetation production on the 290,000 acres proposed for prescribed burns. However, there would be a long-term increase in grass species and vegetation production. Wildfire would create a similar affect for both short and long term.

Localized over use of forage would continue and could increase if full livestock grazing preference is achieved. Riparian areas could decline over the long term.

A short-term impact would occur from the construction of rangeland improvement projects removing vegetation (about 105 AUMs); however, a long-term benefit to overall vegetation production through improved distribution would occur.

Approximately 26,474 acres of mostly low density sagebrush would be lost over the long term due to development activities. In specific areas this could be important, but planning area wide it is not expected to be significant.

Land disposals would increase, resulting in an irreversible and irretrievable loss of the vegetation resource as most disposals are for urban expansion or industrial development.

Activation of suspended grazing preference could result in severe over grazing in the short term and a long-term decline in trend of range condition.

Visual Resources

Under Alternative B, constraints for mineral development would be removed to facilitate production. About

33,000 acres out of 423,000 acres currently managed as Class II would move into Class III. Approximately 145,000 acres out of 330,000 acres currently managed as Class III would move into Class IV. About 2,858,000 acres managed in Class IV would stay the same, and 24,000 acres would be managed as rehabilitation areas.

Overall, additional mineral activities could result in a reduction of visual values for the terms of development. The management actions proposed in the lands and minerals section would increase conflicts with visual resources. Leasing the Wind River Front (VRM Class II) with the standard mitigations necessary to protect visual and other resources would benefit visual resources by ensuring the area would stay in the same management class and retain values.

Protecting National Register of Historic places (NRHP) eligible portions of nondesignated trails by allowing no visible disturbance within ¼ mile, or within visual horizon, would benefit visual resource management (VRM) values by ensuring that the scenic values would not be impacted.

Limiting clearcut units to 25 acres or less would benefit visual resources. Trees are a renewable resource and would reforest an area over the long term, reducing long-term effects.

Maintaining, improving, or restoring riparian values would benefit visual resources by ensuring that these areas would not fall into a lower VRM class. In fact, improving riparian areas could potentially improve an area for VRM values.

Vegetation treatment units within VRM Class II areas would not exceed 100 acres in size, and no more than 25 percent of the area would be treated within a 10-year period. This would benefit the visual resource by ensuring that the area would remain Class II, and reducing the amount of modification or change to a scenic area.

Management of the Killpecker Sand Dunes, Oregon and Mormon Pioneer National Historic Trails, California Trail, the Green River, and the Wind River Front as special recreation management areas and implementing management plans would benefit visual resources by ensuring that any developments and production activities mitigate adverse effects to scenic and aesthetic values.

In designated special management areas, such as ACECs, a plan of operations is required for any surface disturbance activities, regardless of acreage, which would help maintain visual resources. About 88,520 acres or 2 percent of the planning area would provide benefits to visual values.

Recommending approximately 9.7 miles of the Sweetwater River as suitable in the inclusion of the national wild and scenic river system would benefit visual values in these areas by ensuring consumptive land uses would not occur within ¼ mile of the centerline of the rivers.

Allowing habitat improvements only if they are compatible with scenic river values would create a benefit by not detracting from scenic values.

Summary

The overall impact to the existing visual resources would be adverse because management prescriptions would allow for future projects and developments in areas where they are now in conflict. This would reduce the level of visual mitigation required, and allow for long-term or permanent changes to the existing visual quality of those areas.

Long-term effects would occur from non-improvement of rehabilitation areas. Additional impacts may occur due to increased activity and changing of some visual classes to lower classifications to accommodate development. There would be additional acreage managed under Class IV management prescriptions for the short term. Linear facilities, such as roads and pipelines, would have a long-term effect on visual resources due to their high visibility and the extended periods of time required for natural vegetation cover to become reestablished.

Short-term effects would occur to visual quality from smoke associated with prescribed fire and wildfire and the subsequent modification of vegetation, and dust from development and logging activities. Reduced air quality from development and natural causes would have an individual short-term affect. Approximately 95,800 acres would be disturbed over the term of the plan and about 41,000 acres would remain disturbed over the long term. Reduced air quality may become a locally or regionally significant impact due to increased smoke (burns), dust, and emissions.

Watershed/Soils

Fire suppression would cause soil erosion in burned areas at rates dependent on the intensity of the fire and suppression efforts. Full suppression could lead to soil losses of up to 15 tons per acre. Prescribed burns generally affect soil much less than firefighting efforts. Soil loss may increase immediately after the burns due to the removal of vegetation. However, productivity should increase 2 to 3 years after burning with accompanying reductions in soil losses.

Timber harvest would not use vegetative buffer strips along drainages. This activity, along with the increased emphasis on timber production, would result in a higher sediment and phosphate loading in all streams draining timbered areas since the stream side vegetation (an important stabilizing feature) would be lost.

The higher road density resulting from the increased emphasis from sawlog production would provide more opportunities for fuelwood cutters. This may result in an even higher road density as fuelwood cutters may pioneer more two-tracks roads into the forested areas. The higher road density would result in an even higher sediment and phosphate load in many of the streams.

Impacts to the water resource from grazing are caused by overutilization of the riparian areas where soil compaction and vegetative removal can create bank instability. This leads to loss of channel stability and results in higher sediment, salt, and phosphate loads.

Since grazing would be maximized under this alternative, the possibility exists for a much greater loss of riparian areas with an associated increase in sedimentation, salt and phosphate loading. Further complications would result from the large areas of vegetative treatments that would be allowed under this alternative. Augmented flows from the large burned areas would further degrade the stream channel, associated riparian zones, and water quality.

Land actions such as rights-of-ways for linear actions such as pipelines, roads, etc., can adversely affect watershed resources. Because of the extent of these rights-of-way and the related runoff, a very large amount of sediment, salt, and phosphate are produced from the erosion occurring on them (Table 3-16).

The largest impact to water and soil resources from surface disturbing activities associated with minerals activities is erosion and the resultant salt, sediment, and phosphate production. These activities include roads, drill pads, gravel pits, surface mining, borrow pits, and the like.

Because of the proposed increase in exploratory drilling, the possibility of ground water contamination from improper casing and cementing operations, undetected or unreported spills, or other contaminate, transport becomes a real concern particularly with respect to the Superior sole source aquifer. The recharge area for the Ericson aquifer would accommodate surface occupancy thereby increasing the possibility of spills directly on the recharge area.

Soil contamination from drilling fluids and accompanying chemicals for production drilling continue to threaten area soils. Unlined reserve pits offer no protection from contamination to surrounding soils. Burying drilling muds in reserve pits has the potential of limiting soil development and fertility. Oil base drilling muds can contain benzene or other hazardous chemicals.

Oil shale development is not anticipated in the next 20 years. However, regardless of the process involved with oil shale development, the leachate production from the retorted oil shale contains large concentrations of cadmium, boron, selenium, and salt, all of which can affect flora or fauna.

Strip mining of coal has some unique impacts associated with it. The most important impacts are the complete recontouring and denuding of the landscape and the backfilling of industrial wastes associated with mining into the open pits. The result of the recontouring and denuding can create a situation that augments flood flows unless retention ponds are used. These flows if allowed to go unchecked can force stream channels in the area to regrade themselves in response to such flows. This quite commonly results in incision and widening of the stream bed thus causing more sedimentation, salt, and phosphate loading.

All minable coal would be developed in the Bitter Creek watershed except for that coal found in the floodplains of Bitter and Salt Wells Creeks. Such activity could produce increased runoff from the denuded areas. The use of check dams, sediment ponds, contour furrows, french drains, or a combination of these coupled with a reclamation and revegetation strip mining plan would likely have little effect in the Bitter Creek watershed.

Shaft-mined coal could create problems in regards to augmented flows if all the minable coal were to be exploited. The problem centers around the dewatering of coal seams and discharging the water into local streams. This would have the affect of augmented flow regimes which could increase the magnitude of floods and degrade the local channels with the artificial flow magnitudes.

Off-road vehicle use can often impact water and soil resources if done in an uncontrolled manner. The largest impact from off-road vehicle use is sediment production and erosion from uncontrolled stream crossings and riparian area compaction from numerous poorly placed 4-wheel drive roads. Under the assumption that this activity would be allowed to increase and providing areas for hill climbing events would occur, it is quite possible that many stream channels and riparian zones would be further impacted. This may result in soil compaction, bank instability, augmented flows, increased sediment, and salt and phosphate loads.

Outdoor recreation centered around water bodies would result in increased streambank compaction and streambank sloughing as well as the increased likelihood of raw sewage being deposited in the stream channel or at least nearby. The results of such use could cause the loss of riparian areas and associated vegetation as well as an increase in salt sediment and phosphate loading in the stream or waterbody.

Impacts from vegetation removal by fire or other means would have an adverse effect on the stream hydraulics. Vegetation removal with regards to livestock management would augment flow regimes thereby forcing the stream channels to readjust with respect to width and depth. This would create a great many unstable streams which would produce large amounts of sediment, salt, and phosphate.

Fewer instream fisheries projects would be initiated. Structure failure and poor placement would be less of a problem because of the low density of such structures.

Summary

High sediment, salt, and phosphate loads would be realized from those activities which disturb the surface such as burning, road and pad building, trampling by livestock, recreational use, surface and subsurface mines, timber harvest, and off-road vehicle use. Associated with the high sediment loads would be increased amounts of runoff from the denuded areas thus causing increased occurrences of channel incision and widening from the augmented stream flows.

Due to the increase in oil and gas activity, there could be a higher re-occurrence of downhole problems resulting in the intercommunication of fresh and salt water aquifers, thereby contaminating the fresh water zones.

Long-term benefits would occur to watershed resources from mitigation measures and particularly no surface occupancy areas preventing disruption of soil and watershed values. Additional activity would affect soil stability.

Watershed stability would decrease over the long and short term due to increased activity. Some sediment loading and overuse due to livestock would continue over the long term but would decrease from current levels.

Revoking withdrawals would allow locatable mineral development which could cause an increase in sedimentation and siltation.

Wild Horses

The management actions proposed in this alternative could have an adverse impact to wild horse management. The activation of suspended non-use could cause severe competition for available forage between livestock and wild horses. Some of the acreage proposed for brush treatment (290,000 acres) could occur in wild horse areas. Where treatment occurs in the wild horse herd management areas, it would create new areas available for grazing to wild horses and livestock under management systems. This situation could provide rest for riparian areas thus improving ecological condition classes. Most of the condition class improvements could be expected in 10 years.

As in Alternative A, a short-term loss of vegetative production would occur in each wild horse herd management area as a result of brush treatment, but in the long term, vegetation production and quality should improve. The impact to wild horses would be minimal since they tend to move away from treated areas for a short period. However, wild horses have been observed grazing burned areas as soon as one year following treatment.

As in Alternative A, proposed range improvements would be implemented and the estimated loss of forage in the wild horse herd management areas would be about 8 AUMs.

About 16,200 AUMs would be provided for wild horses in 4 Wild Horse Management Areas. No horses would be maintained or managed in the Figure Four Allotment of the Desert Common-Figure Four Interim Herd Management Area.

A significant impact to wild horses would result due to management actions described for lands and mineral activities. The acreage proposed to be disturbed would be approximately 110,515 acres or 6,435 AUMs over a 20-year period. Reclamation would take place on a significant amount of this acreage, and the long-term loss would be approximately 60,557 acres or 5,052 AUMs. Most of this forage loss is expected to occur in wild horse herd management areas.

The BLM would continue to participate in the Wyoming Weed and Pest control program. This action would be moderately beneficial to wild horses.

Off-road vehicle use would continue to cause some impacts, particularly with harassment of wild horses.

The 6 developed and 5 undeveloped recreation sites would cause no impact to wild horses.

Avoidance of significant cultural sites, limitations on activities within ¼ mile of historic trails, and subordination of activities to historic landscape values in some areas may constrain the BLM's ability to construct rangeland improvements aimed at achieving better distribution and management of wild horses. Added survey and design costs may be necessary to avoid effects to cultural resources.

A proposed land exchange in the Fourth of July Allotment could cause management problems with wild horses if fencing is proposed to manage the blocked private lands.

The fertility and selective gathering program for wild horses would not adversely impact the herds. These actions would improve herd condition quality and specific wild horse characteristics described in the management plans.

There would be no known impact to wild horses due to candidate plant management. The 3,510 acres of no surface occupancy stipulations in candidate plant locations would not affect wild horse management.

The conflicts for vegetative resources and forage between horses and wildlife would continue to occur.

Rangeland improvements and permanent water sources would be constructed for wild horses. The planning area has identified the need for at least 15 water sources. These proposed developments would benefit wild horse grazing distribution patterns.

There would be no known impacts or conflicts to wild horse management due to management actions described for the White Mountain Petroglyphs or Red Creek ACECs.

If the Pine Springs, Natural Corrals, Greater Sand Dunes, and Cedar Canyon ACECs were opened to mineral sales or leasing, loss of forage could occur in wild horse herd management areas due to surface disturbance.

An impact to wild horse management could arise due to the 50 percent utilization level in the Greater Sand Dunes ACEC. This level is not a current objective in the Sands Allotment Management Plan, the Rock Springs Allotment, or the Divide Basin wild horse herd management area. The Sand Dunes AMP and Divide Basin wild horse herd management plan would have to be modified to support this action. Utilization levels would have to be imposed in the sand dunes area of the Rock Springs Allotment.

No surface occupancy stipulations in the Oregon Buttes ACEC could affect future rangeland project construction needed for management of wild horses.

Wild horses would be placed under stress as a result of being captured. Some horses may be killed or injured. However, according to past experience, this number would be less than 1 percent of the horses gathered.

Summary

Short-term and long-term losses of forage would occur due to development activities, material sales, and rangeland improvements affecting approximately 6,435 AUMs. Prescribed burning on 290,000 acres and wildfire would have a short-term impact on forage but should result in a long-term increase in productivity of forage. Long-term impacts would affect another 3,047 AUMs due to range and wildlife improvements, lands and realty actions, and mineral developments removing forage for long periods of time.

No surface occupancy requirements affect project placement and development aimed at improving wild horse distribution (107 acres). This could have a long-term affect, and distribution problems would continue for both the short term and long term.

Approximately 30 AUMs would be lost over the long term due to construction of range improvements in wild horse herd areas. Development of 15 water facilities would provide a long-term benefit to horses by improving distribution patterns. A short-term vegetation loss would occur during construction. A long-term increase to full livestock grazing preference could create competition for forage.

Wildlife

Impacts described in the Preferred Alternative would be the same under this alternative from management of fences, livestock water development, sheep to cattle conversions, unallocated forage, gold mining, jade mining, zeolite mining, and chemical treatment of vegetation.

Impacts described in Alternative A would be the same under this alternative from management of Steamboat Mountain and Boar's Tusk-Killpecker dunes; timber cutting in Wind River, Pine, and Little Mountains; rights-of-way within the Currant Creek watershed and Red Creek ACEC; and coalbed methane development.

A 25-acre clearcut management prescription could reduce calving and fawning areas and reduce the quantity and quality of arboreal wildlife habitat by about 26 acres annually.

Approving new communication facilities in areas where wildlife conflicts are identified (Steamboat, Little Mountain, Hickey Mountain, etc.) could adversely affect about 282 acres of crucial big game habitat. An estimated 13,705 acres of wildlife habitat may be lost over the next 20 years.

Rangeland which supports steppe habitat biodiversity is already heavily used in some places and grazing authorization of 408,437 AUMs should result in considerable wildlife habitat deterioration. Riparian, aquatic, and wetland habitats degradation of 45 to 70 percent is anticipated under the "full stocking" scenario. Actual riparian and wetland loss (lower bank saturation, headcutting, etc.) may amount to 30 percent or more. Activation of suspended non-use may impact wildlife and riparian habitats through lower forage availability, long-term change in range type, trampled springs and other water sources, deterioration of streambanks, siltation of pools and riffles, trampling of T&E plant species, and heavier requirements toward Animal Damage Control.

Allowing a decrease to 50 percent riparian habitat at proper functioning condition after 10 years would reduce riparian/wetland recovery compared to the Preferred Alternative.

Allowing livestock use in the Palmer Draw and other special wildlife management areas could cause rapid deterioration of these sites to the point they are no longer valuable for wildlife.

Future oil and gas activities could impact approximately 283 raptor nests, 1,600 acres of sage grouse nesting habitat and cover, 15,625 acres of big game crucial winter range, and 57 acres of riparian/wetland under the production alternative. Development is anticipated to occur in the Greater Nitchie Gulch (1,137 acres), Little Colorado Desert (2,404 acres), and Wamsutter Arch (845 acres) oil and gas fields. The remainder of the planning area would have about 11,239 acres of disturbance within crucial big game winter ranges. Percentages of big game habitat in each area are the same as discussed in the Preferred Alternative.

Presently, elk are displaced from habitat in the Nitchie Gulch area by oil and gas development. In 20 years, about half of the area could be available for elk use.

Big game habitat loss results from road construction and road use, pad construction, pipeline construction, field facility maintenance, and disturbance zones around these areas, cumulative effects of yearlong livestock activity after compound habitat impacts through displacement, forage competition, water competition, and social interaction. Fire could result in long-term loss of habitat and would be considered an unavoidable adverse impact to the habitat.

Actual wildlife habitat lost over the next 20 years due to oil and gas development would amount to about 6,327 acres in the Little Colorado desert, 4,445 acres in Wamsutter Arch, 1,223 acres in Greater Nitchie Gulch, and 19,037 acres in the remainder of the planning area (total of 31,032). These acreages would not be fully reclaimed and portions would remain out of usable habitat for wildlife species for 20 years or more. Limited rainfall, poor soils, nd severe winter conditions make reclamation difficult, increasing the time required to re-establish suitable vegetation to pre-disturbance composition and density.

Some further decline in sage grouse populations could be expected if disturbance in sage grouse leks and the 1¾ mile buffer is permitted. Allowing disturbance in all habitats during all seasons without restrictive stipulations should result in significant reductions in wildlife survival, reproduction, and an adverse economic impact to western Wyoming.

Mining and associated activities could adversely affect an estimated 22,000 acres of big game habitat over the short term. Although reclamation is ongoing during the life of a mine, there should still be 24,370 acres of big game habitat lost to use after 20 years, with an even greater acreage needing reclamation after 20 years. Mining the Beans Spring Tract could adversely reduce the South Rock Springs deer herd to below a huntable population level. Surface mining of coal could adversely affect about 216 nests and about 17,500 acres of suitable raptor habitat. There is potential for mining in the North Fork of Vermillion Creek area. Should mining occur, this would adversely affect fish habitat in this stream. North Fork of Vermillion Creek has high potential for reintroduction of Colorado River cutthroat trout.

About 58 miles of perennial and ephemeral streams and approximately 30 acres of standing waters are in the potential coal area. Under the reasonable foreseeable development scenario, between 9 and 16 percent of these habitats could potentially be disturbed or eliminated.

Surface facilities in the known sodium leasing area would remove approximately 5 percent of the crucial antelope winter range from wildlife use.

Stipulations should reduce impacts to wildlife from geophysical activities during crucial seasons and periods. Disturbances to playa lakes (29,120 acres) can adversely impact wildlife species associated with these special habitats. Geophysical activities would have the short-term displacement effect on about 450 miles of habitat annually, with another 30 miles needing long-term reclamation. Increased siltation of some aquatic habitats is expected to occur when the entire planning area is open to geophysical exploration.

No seasonal protection for crucial wildlife habitats from off-road vehicle use is provided. Adverse impacts within and adjacent to sensitive and crucial wildlife habitats are expected to increase stream siltation, disturbance to sage grouse during breeding, and haze raptors during nesting.

Adverse impacts to wildlife from recreation use are associated with disruption during reproductive periods, potential habitat loss at campgrounds, and environmental contamination.

Seasonal recreation activity around raptor nests may cause abandonment and both indirect and direct mortality. Seasonal closures in some camping and/or recreation areas may reduce impacts to crucial wildlife habitats. Camping near springs and other water sources critical for wildlife may result in water degradation through contamination and would displace wildlife use to other areas where camping does not occur.

Providing no buffer stipulation for many of the streams leaves them open to siltation from ash and sedimentation by removing the upland filtration component. Spawning areas could be lost due to silt deposition following treatment. Burning the inner gorges of ephemeral and intermittent streams would adversely impact travel lanes of wildlife where cover is most important. This action would also leave these drainages open to erosion and potential headcutting over the long term.

Removing brush as a priority would be adverse to management of wildlife habitat, as cover is of primary importance as a component in steppe habitat.

Changing some of the present VRM classes may allow development where little previously existed. Under Alternative B, some wildlife displacement, fragmentation of travel corridors, and additional disturbance in sensitive habitats could be expected.

Summary

Increased activity overall and emphasis on production would create an increased adverse effect to wildlife habitat and populations.

Adverse impacts to crucial wildlife habitats (i.e., riparian areas, winter ranges, etc.) from livestock grazing would increase over Alternative A. Development of new AMPs and/or revision of old AMPs to include riparian objectives or to protect other crucial wildlife habitats would occur over the next 20 years and benefits would accrue slowly. Until new range surveys or sufficient monitoring is conducted to determine AUM availability, crucial wildlife habitats would continue to decline in some areas. It would be unlikely that sufficient habitat could be provided to meet WGFD Strategic plan population objectives.

Seasonal stipulations would not be used in many cases. This would cause impacts to wildlife during critical periods and may directly or indirectly cause displacement or mortality (see Appendix 12). When seasonal stipulations are used, they provide short-term protection for wildlife. Long-term maintenance and operations activities in crucial wildlife habitats would increase in scope and continue to cause displacement of wildlife from crucial habitats, including disruption of nesting, fawning and calving areas, and crucial big game winter habitats.

The combination of mineral and livestock activities in crucial wildlife habitats (i.e., big game winter ranges, parturition areas, riparian, etc.) creates impacts that may be unacceptable in some locations (e.g., Steamboat Mountain area, Cedar Canyon, etc.). Displacement of part of the Steamboat Mountain elk herd could result in not being able to maintain a viable hunting population.

Displacement and loss of habitat from development and disruptive activities would create an unavoidable adverse impact (see Table 4-25).

Activation of livestock grazing preference could in the long term create competition for forage and could adversely affect capabilities of meeting habitat requirements for Wyoming Game and Fish Department Strategic plan levels. Long-term impacts would continue to occur to wildlife habitat due to production activities and year round use in crucial areas.

Special Management Areas

Candidate Plants

Impacts would be the same as those discussed in Alternative A.

Cedar Canyon ACEC

Beneficial affects to the major petroglyph site in the Cedar Canyon would be the same as Alternative A. Archeological sites, other than the major 20-acre petroglyph site, would generally be dealt with under standard Section 106 compliance prescriptions which could result in some adverse effects to them.

Management activities in Cedar Canyon could increase over Alternative A and have long-term adverse impacts on resource values. Visual intrusions could destroy the integrity of the setting of the petroglyphs. Displacement of big game from crucial winter range habitat would continue over the long term due to continued and increased traffic and road use, construction, and production activities and over-the-snow vehicle use. Habitat availability could decline with further development activities.

Coal could be leased, but no surface mining or facilities would be allowed to detract from the ACEC values.

Greater Sand Dunes ACEC

In the western portion, impacts would be the same as described in Alternative A.

The eastern portion would no longer be included within the ACEC boundary. However, management prescriptions and restrictions would be designed to preserve and protect the geological, cultural, visual, and wildlife values associated with the area. Implementation of the prescribed measures would reduce or minimize adverse impacts associated with mineral development, lands actions, and off-road vehicle use. Residual adverse impacts would be greater than Alternative A but would not be significant and would include:

> Seasonal displacement of wildlife, predominantly elk and deer, as well as wild horses would occur through off-road vehicle and development activity. Seasonal displacement would be most prevalent during the summer and fall months. Dune ponds and related riparian habitat would continue to be affected by livestock, wild horses, and wildlife use.
>
> Loss of vegetation on stable dunes would potentially occur through the development of oil and gas reserves and through facilities associated with oil and gas development. Potential oil and gas development in the 16,390 acres open to 4 wells per section could disturb up to 359 additional acres.
>
> Reductions in the visual integrity of the area would result from development of up to 100 new oil and gas wells and from related rights-of-way activities in the area.
>
> Off-road vehicle opportunities would be lost on 5,000 acres and surface facilities (e.g. pipelines, snow fencing, etc.) would create safety hazards to ORV users.

Benefits that would be realized through the management prescriptions and restrictions include the protection of sensitive cultural resource sites including Crookston Ranch and protection of the Native American religious and important geological values associated with the Boar's Tusk.

Further benefits would be realized from the acquisition of approximately 1,920 acres to consolidate public lands in the dune area which would enhance wilderness, visual, and wildlife values, the removal of abandoned facilities and the marking of known hazard areas would reduce some of the potential impacts to ORV users, and retention of forage and native plant compositions for wildlife and the retention of 5,390 acres as an "open" ORV area for recreational uses.

Monument Valley Area

Although it is not possible to quantify, some paleontological resources would be lost or destroyed in Monument Valley due to development activities and unauthorized uses. Impacts to cultural resources would be the same as discussed in Alternative A.

Some long-term impacts may occur to soils, slopes, and visual values due to activities on adjacent private lands requiring access across public lands. Silt production and sedimentation would occur. Unauthorized use could continue and result in an irretrievable loss of soil, cultural, and paleontological resources.

Management of the area would provide for solitude and dispersed recreation but no additional facilities would be provided which could, in the long term, limit recreation opportunities. Management of wild horses would benefit area recreation values.

Oil and gas management and production would benefit in the short and long term. Revocation of the oil shale withdrawal within the area could result in mineral location and increased surface disturbance resulting in loss of paleontological resources, and sedimentation and siltation from disturbance on erosive soils.

Natural Corrals ACEC

The same benefits and impacts described in Alternative A are projected for cultural resources, unauthorized use, and locatable mineral development activities.

The impact of Class IV visual management is the same as for Alternative A. Development activities such as other surface disturbing activities on 636 acres would adversely affect area geologic and ecological values and would cause an irretrievable loss of these resources.

Oregon Buttes ACEC

Impacts would be the same as Alternative A.

Pine Springs ACEC

Impacts would be the same as those of Alternative A.

Red Desert Watershed Area

Impacts from Alternative B to management of the South Pass Historic Landmark and candidate species from ORV use and affects to visual values would be the same as discussed in Alternative A.

No impacts to cultural resources would occur.

Although VRM classes would not be changed, long-term impacts could occur to visual values from construction of facilities, particularly powerlines. Most activity is anticipated to occur in the southern checkerboard portion of the area, and visual impacts would be localized to this area.

Management under Alternative B would further reduce the level of solitude and dispersed recreation from Alternative A and the Preferred Alternative due to higher levels of oil and gas development. The adverse cumulative impact would be considered significant in the southern portion.

Approximately 138 wells would be drilled in the area, with 123 anticipated to be drilled in the checkerboard. One hundred and seventy-three (173) plugged and abandoned wells already exist in the area. Coal mining in relation to the Bridger mine and Deadman Wash proposed project would affect only a small portion of the watershed.

These development activities remove vegetation creating a short-term loss of the vegetation resource with some long-term loss of shrubs as restoration requires 20 years or longer. Impacts to vegetation affects available AUMs for livestock and horses and wildlife habitat. The amount affected would be greater than Alternative A but would not be significant.

South Pass Historic Landscape

Impacts would be the same as those of Alternative A.

Steamboat Mountain Area

Surface disturbing activities, including 50 coalbed methane wells, traditional oil and gas activity, and rights-of-way would result in a long-term loss of wildlife habitat and subsequent displacement of wildlife and in particular the portion of the Sands Elk herd on Steamboat Mountain. This would also result in a long-term loss of watchable wildlife opportunities, and a loss of forage for livestock and wild horses. Unauthorized uses would further displace wildlife. Camping around springs in the area would continue to impact riparian vegetation and water quality for the long term.

This loss of habitat and watchable wildlife opportunities would be considered a significant impact.

Tri-State Monument Area

Impacts to watershed values from vegetation manipulation, wildfire suppression restrictions, and ORV activity would be the same as discussed in Alternative A.

Impacts from accelerated erosion would be somewhat greater than discussed in Alternative A as the only avoidance area to rights-of-way would be within the Red Creek ACEC which would reduce sediment loads in that area but also would require major reroutes of facilities around that area.

Watershed and fisheries resources would receive the least benefit under this alternative.

There is potential for surface and subsurface mining to occur on about 9,600 acres of the Sage Creek portion of the area. Surface mining activities would adversely affect fisheries, watershed, and cultural values. Colorado River cutthroat trout habitat on Trout Creek would be adversely affected which could affect trout populations.

Mining around springs and seeps could affect related aquifers and adversely affect the headwaters to Sage Creek. Increased sedimentation and siltation would also occur which could adversely affect the Flaming Gorge Reservoir and related fishery. Slumping and landslides along Mellor Mountain could also result from mining activities.

Surface mining activities would also adversely affect a large cultural NRHP eligible site. Additionally, visual values, livestock grazing, and wild horse use would be affected, but to a lesser extent than fisheries, watershed, or cultural values.

Currant Creek/Sage Creek

Short-term impacts would occur from vegetation manipulation but should result in long-term benefits. Management prescriptions for surface disturbing activities could allow additional activity such as rights-of-way and other activities. Sage Creek would benefit over the long term from the preparation of plans to mitigate impacts prior to disrupting and disturbing activities. ORV activity over the long term could adversely affect water quality, watershed values, and fisheries habitat. Withdrawal revocation would allow locatable mineral activity and land disposals, increasing the potential for long-term impacts.

Red Creek ACEC

Impacts from accelerated erosion due to maintaining status quo in the Red Creek drainage would be the same as Alternative A. Soil stability and productivity would not increase until the vegetative cover is improved and additional disturbances are properly mitigated, reduced, or eliminated. Unnecessary rill and gully erosion would continue until linear disturbances (roads, pipelines) are stabilized through improved maintenance, or closure and reclamation.

Activation of full and suspended grazing preference would increase long-term adverse affects would to riparian and watershed values. This could adversely affect wildlife habitat and the wildlife numbers that could be sustained in the area.

Wildfire and suppression activities could remove vegetation which would also contribute to the accelerated erosion. Revocation of withdrawals would allow locatable mineral activity and land disposals which could result in adverse affects to watershed values.

Natural geologic erosion would continue for both the short and long term and would be considered an unavoidable adverse impact.

White Mountain Petroglyphs ACEC

Impacts would be the same as those of Alternative A.

Wild and Scenic Rivers

Designation and interim management prescriptions would provide a beneficial impact and protect wild and scenic river values on the Sweetwater River for the long term. Some impacts may occur from mining claim activity but the probability is slight.

Alternative B Summary

This alternative would allow for additional development of mineral resources and other commodities not allowed in Alternative A. By allowing more areas to be open for development and placing fewer restrictions on that development, more efficient production and reduced costs would be achieved. Additional potential impacts would occur to air quality, visual values, vegetation, cultural and historical resources, and wildlife habitat. Displacement of animals and increased demands for forage could create additional stress on wildlife, concentrate uses in non-traditional areas, and affect the vegetation resource. Increased levels of oil and gas development within the southern portion of the Red Desert Watershed area would cause significant adverse impact to solitude and dispersed recreation.

Although not projected, any future proposed coal mining within the Cedar Canyon, Greater Sand Dunes, or Natural Corrals ACECs would adversely affect their contained values and would conflict with the management objectives of each ACEC. This potential impact was determined to be unacceptable and other alternatives to protect these ACECs were developed. Coal mining in the Cooper Ridge and Elk Butte areas, individually or in conjunction with other mining activity, may adversely affect deer habitat (and somewhat antelope habitat) to a point that the affected herd would be displaced and a viable herd unit could not be sustained in the area. If this occurred, then deer management objectives would not be met. Until specific studies area completed, the extent of the impact cannot be determined. The potential loss of a viable herd was considered an unacceptable level of impact and other alternatives were developed to provide protection to the herd.

ALTERNATIVE C

Assumptions

In addition to the Assumptions and Assessment Guidelines for all alternatives, these assumptions for lands and realty, livestock grazing, minerals, off-road vehicles, and socioeconomics specifically apply to Alternative C.

Lands and Realty

About 13,043 acres would be identified as possibly suitable for disposal through sale or exchange actions. About 19,620 acres are proposed for land acquisition which includes 640 acres for ACECs, 40 acres for cultural, 840 acres for riparian, 5,120 for state inholdings in WSAs, 3,040 acres for wild and scenic rivers, 3,380 acres for wildlife, 4,020 acres for fisheries, 1,920 acres for candidate plant species, 960 acres for watershed, and 300 acres for public access. Approximate acreage of additional withdrawals would be 279,324 acres.

Land Use Authorizations

During a 20-year period, an average of 300 permits, 4 leases, and 1,452 rights-of-way would be issued.

Table 4-14 shows the number and acres of authorizations over a 20-year period. Not all authorizations result in surface disturbance.

Estimated total acreage disturbed over a 20-year period would be 7,493 acres (this does not include the 6,184 acres of road associated with oil, gas, and coalbed methane production shown under Oil and Gas and Coalbed Methane Assumptions).

Estimated total acreage reclaimed over a 20-year period is the same as the Preferred Alternative. It is estimated that there would be 7,000 acres (this does not include the 1,100 acres of oil and gas roads relinquished and reclaimed shown under Oil and Gas Assumptions).

No desert land entries or agricultural leases would be authorized within this planning area due to salinity/soil constraints.

Withdrawal Revocation

Table 2-7 presents the withdrawals that would be revoked or retained for each alternative.

Livestock Grazing

Adequate forage is available for current wildlife objective numbers. Forage increases would be given first to wildlife and wild horses and then to livestock. About 26,700 acres would be treated by using prescribed burns to improve forage. No new fences would be built and herder control for all livestock would be instituted. Estimated actual use would be 180,000 to 200,000 AUMs.

Minerals

Coal Operations

It is reasonable to expect that further leasing would not occur, but that mines currently operating and areas currently under lease would be developed (Black Butte/Pit 22, Bridger, Lion Coal, and Pilot Butte areas). Table 4-32 shows the estimated amount of yearly coal production and total production from mining these areas. About 375.5 million tons, life of mine, recoverable coal would be available. The average yearly amount of disturbance would be about 528 acres with an average yearly production of about 14.8 million tons of coal.

Oil and Gas and Coalbed Methane

Tables of Projected Drilling Activity and Associated Surface Disturbance were prepared for the planning area (Table 4-33), each of the 3 Special Study Areas (Table 4-17; Table 4-18; and Table 4-19) and for coalbed methane (Table 4-20). Table 4-11 projects annual production rates of oil and gas through 2010.

Mining Law

The impacts would the same as the Preferred Alternative. An oil shale withdrawal covers a large portion of the Green River and Washakie Basins within the planning area, prohibiting the location of mining claims. At some point, the oil shale withdrawal would be revoked. New mining claims would begin to be located in this area after revocation, especially for zeolite in the Washakie Basin.

It is assumed that demand for naturally occurring zeolite would increase, just as demand for naturally occurring sodium carbonate (trona) has increased. At least 1 mining operation for known zeolite deposits would be initiated. Such zeolite development would likely use the equipment and methods of a bentonite mine or a gravel pit, such as scrapers, dozers, belly dump trucks, etc. A zeolite mining operation would employ approximately 8 to 10 people mining 9 to 10 months of the year, at an annual rate of up to 100,000 tons. Table 4-21 projects the amount of surface disturbance associated with a hypothetical zeolite mine.

TABLE 4-32

ESTIMATED YEARLY COAL PRODUCTION BY TRACT AREA ALTERNATIVE C (million tons)

Year	Black Butte/ Pit 22	Bridger	Lion Coal	Pilot Butte	Total Production
1990[1]	5.8	5.8	0.11	0.19	11.90
1991	5.8	6.0	0.11	0.2	12.11
1992	5.8	6.0	0.10	0.5	12.4
1993	5.6	6.0	0.06	0.7	12.36
1994	5.8	5.9	0.05	3.9	15.65
1995	6.0	5.8	0.05	3.9	15.75
1996	6.0	5.9	0.05	4.0	15.95
1997	6.0	5.9	0.04	4.0	15.94
1998	5.8	6.0	0.03	4.2	16.03
1999	5.8	6.0	0.03	4.0	15.83
2000	5.7	6.0	0.02	3.9	15.62
2001	5.8	6.0	0.01	3.9	15.71
2002	6.0	5.8	0	3.9	15.7
2003	6.0	5.8	0	4.0	15.8
2004	5.9	5.8	0	4.0	15.7
2005	5.8	5.6	0	4.2	15.6
2006	5.8	5.5	0	4.0	15.3
2007	5.7	5.5	0	4.0	15.2
2008	5.6	5.3	0	4.2	15.1
2009	5.6	5.1	0	3.3	14.0
2010	5.5	5.1	0	0.7	11.3

[1] Actual production, base year

Of the 4 mines active at the beginning of the next 20 years, only Black Butte, Bridger, and Pilot Butte would still be on line by 2010. Lion Coal mine would cease production after 2001.

Off-Road Vehicles

1990 data shows that 342,550 visitor hours (28,546 visitor days) were spent in the Green River Resource Area. It is anticipated that visitor use days would increase by approximately 40 percent over 20 years due to historical trends of recreation increase as reflected in the annual Recreation Management Information System (RIMS) Report.

Socioeconomics

Livestock assumptions are the same as discussed in the Preferred Alternative.

Wild Horses

Same as Preferred Alternative. Fifteen water developments would be proposed in the Rock Springs Allotment primarily to enhance wild horse habitat (Appendix 9-4). Only controlled waters (i.e., wells) would be developed.

TABLE 4-33

PROJECTED DRILLING ACTIVITY (1990 - 2010) AND ASSOCIATED SURFACE DISTURBANCE GREEN RIVER RESOURCE AREA (ALTERNATIVE C)

A. Most Probable Future Projection[1]	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
1. Wells Drilled	70	138	207	272	337	401	465	528	590	652	713	774	834	893	952	1010	1068	1125	1181	1237	1296
2. Expected Producers[2]	44	87	130	171	212	253	293	333	372	411	449	488	525	563	600	636	673	709	744	779	816
3. Expected D&A	26	51	77	101	125	148	172	195	218	241	264	286	309	330	352	374	395	416	437	458	480
4. Abandoned Producers[3]	12	28	49	89	109	157	186	241	303	362	440	486	547	623	660	682	697	738	780	818	961
5. Total Producers (349 as of 12/89)	1744	1771	1793	1794	1815	1808	1819	1804	1781	1761	1721	1714	1690	1652	1652	1666	1688	1683	1676	1673	1567
6. Acres of Surface Disturbance	10435	11203	11979	12713	13446	14172	14892	15605	16304	17003	17688	18380	19052	19722	20387	21038	21695	22338	22968	23598	24263
7. Acres Stabilized[4]	488	1069	1456	2085	2718	3384	4113	4741	5502	6167	6955	7769	8568	9453	10180	10972	11832	12497	13078	13625	14293
8. Net Long-Term Disturbance[5]	9947	10134	10523	10628	10728	10788	10779	10864	10802	10836	10733	10611	10484	10269	10207	10066	9863	9841	9890	9973	9970

[1] Cumulative Totals

[2] Success Ratio = 0.63

[3] Gas Well Productive Life = 20 Years; Oil Well Productive Life = 50 Years

[4] Assume 3-Year Stabilization

[5] Row 8 = Row 6 - Row 7

Impacts Analysis

Air Quality

Coordination requirements, and enforcement responsibilities would be the same as for Preferred Alternative.

Because of the nature of the Bureau's responsibilities in air resource management, the policies and actions assumed for this alternative also would produce few changes in the basic air resource management practices of the planning area. Much more coordination, particularly with the state regulators would be required to encourage them to support BLM efforts to protect air resources beyond the minimum required by law or to strengthen the regulations to make the protection requested by the BLM a requirement. Increased protection of watershed/riparian resources, cultural resources, and wildlife habitat would lessen affects from Alternative A.

Summary

Adverse impacts to users could occur because of restricted location for placement of facilities.

Surface mining, construction activity, road use, facility emissions, prescribed fire, and wildfire affect air quality. Individual fires and construction activities have a short-term affect. Industrial emissions, dust from continued road use and surface mining, and vehicle emissions would be anticipated to occur over the long term. The level of construction activity would be reduced and impacts would be less than the Preferred Alternative, or Alternatives A and B. However, additional acres burned through prescribed fire would increase short-term impacts from smoke generated. No irreversible irretrievable impacts would be expected.

Candidate Plant Species

Stringent management actions would be implemented to protect cultural and paleontological resources and thereby benefit or have no impact to candidate plants or potential habitat areas.

Fire suppression activities would be limited to existing roads and trails in actual candidate plant locations and potential habitat; therefore, there would be no impact to candidate plants.

Management of actual candidate plant locations and potential habitat areas as right-of-way avoidance areas would ensure no damage or impact to candidate plant populations. Other impacts are similar to those described for Alternatives A and B.

Actual candidate plant locations would be closed and potential habitat areas would be limited to existing roads and trails for geophysical activity. These actions would prevent damage to existing populations and potential habitat. No surface occupancy stipulations and closures to mineral material sales and location would prevent damage to actual plant locations and potential habitat areas.

Unauthorized off-road vehicle use could damage candidate plants and potential habitat areas.

Management actions described to protect air quality, cultural and paleontological resources, vegetation, watershed values, wilderness values, wildlife habitat, wild and scenic rivers, and special management areas would generally have the same impact to candidate plant populations as described under Alternative A. Forest, livestock grazing, recreation resources, and wild horse management activities would have the same impact to candidate plants as described under Alternative A.

Other impacts are similar to those described for Alternatives A and B.

Summary

Activities such as wildfire and related suppression activities, salting or areas where livestock concentrate, chemical control of noxious weeds, geophysical activity in potential habitat areas, off-road vehicle use, increased recreation use, trampling by wild horses, closure or expansion of the McKinnon dump, and conversions of sheep to cattle all contribute to an irreversible irretrievable loss of the plant populations. However, additional restrictions on geophysical activity, off-road vehicle use, and fire suppression activities would reduce the level of impact from Alternative A. Mining claim activity and unauthorized uses could create an unavoidable adverse impact and could result in an irretrievable loss of plant populations.

Cultural, Natural History, and Paleontology

Impacts listed for these resources would not generally be significant once steps outlined in Assumptions and Analysis Guidelines are followed. Disturbance with no mitigation would occur for some non-NRHP sites and very rarely on NRHP eligible sites.

The same Preferred Alternative benefits and impacts are projected for: preparing site specific cultural resource management plans; management of cultural resources in Little Colorado Desert, North Nitchie Gulch, and Wamsutter Arch areas; Steamboat Mountain and Boar's Tusk-Killpecker Sand Dunes area; land disposal; Fort LaClede; retaining and adding cultural withdrawals; coalbed methane development; zeolite mining; allowing or not allowing geophysical vehicles and explosive charges; watershed conflicts; and wild and scenic river management.

Construction of well locations, pipelines, and access roads could destroy approximately 28 sites and destroy the integrity of an undetermined number of miles of historic trails.

Construction of linear rights-of-way could destroy approximately 6 sites.

Not leasing any new coal tracts would prevent impacts from coal mining. Since impacts associated with existing mining operations have already been mitigated, virtually no new impacts are foreseen.

Although only 61 acres of surface disturbance is projected, the areas where development is proposed includes a playa lake-sand dune complex of known high site density. It is estimated that 12 significant sites could be destroyed.

Increased ORV closure or limitation to designate roads and trails on approximately 604,000 acres would lessen potential impacts to historic properties by lowering the potential for vehicular damage and unauthorized activities such as vandalism and looting.

Managing approximately 11,400 acres of Class II VRM would result in protection for significant rock art sites.

Summary

Generally less surface disturbance activity would result in fewer cultural resources being jeopardized. Potential impacts to approximately 138 cultural resources would result from surface disturbing activities. Destruction of sites could result from scientific research and from data recovery mitigation efforts. While data recovery enhances our knowledge, it also destroys the resource. Targeted management efforts within cultural resource management plans would benefit and enhance cultural resources. If sites are not avoided, an irretrievable loss of the resource would occur.

Other actions providing long-term benefits to cultural management would be: acquisition of Fort LaClede, 7,727 acres of withdrawals, management of the Steamboat Mountain and Boar's Tusk-Killpecker Sand Dunes areas for geologic and ecologic values, management of 11,400 acres as Class II VRM around significant rock art sites, closure or limitation of areas for off-road vehicle use, and closure of 34,902 acres to geophysical vehicles and explosive charges.

Information gained from research on archeological resources would provide valuable insight into past climates and human use of resources which could improve management of public lands.

Fire

Fire impacts would be the same as described under Alternatives A and B. Increased activities could add to the ignition potential; thus adding to the fire occurrence. Prescribed fire areas would be developed, allowing more fires to burn under specific environmental conditions and fire management criteria. Areas would be identified on drainage characteristics of the area.

Summary

Short- and long-term impacts could occur from additional costs for wildfire suppression and prescribed fire, accrued from restrictions imposed by other resource management requirements. The additional restrictions under this alternative would increase costs over Alternative A.

Forestry

Implementation of this alternative would result in all forested lands in the planning area being placed in a category designed to enhance or maintain other resource values. Timber harvest objectives would be regulated by watershed, wildlife, recreation, and scenic resource needs. The projected maximum annual sale quantity for this alternative of 500,000 board feet would equate to a 55 percent reduction for the maximum output projected through the 1985 annual sale quantity computations for the Rock Springs District. If the implemented annual sale quantity is less than 500,000 board feet, the percent reduction would be even greater. In addition to the substantial reduction in available sales quantity, Alternative C would place a variety of operational restrictions on forest management activities.

Operational Restrictions

Timber harvesting would be limited to removing trees that have been damaged or killed by a natural catastrophe. Tree harvesting would be allowed when its primary objective would be to benefit wildlife, watershed, and/or recreation values.

No timber management activities or firewood gathering would be allowed on an estimated 400 acres of commercial forest land within ¼ mile of potential wild and scenic river segments on the Sweetwater River (see the forestry impacts section of the Preferred Alternative for a description of the acres affected by this restriction).

No surface occupancy would be allowed on roughly 150 acres of commercial forest land that occur within 500 feet of live water, floodplains, and/or riparian/wetland areas (excludes acres that fall within wild and scenic river restriction).

Clearcuts would be limited to a maximum of 25 acres.

Seasonal Restrictions

Logging and fuelwood gathering would not be allowed on 1,436 acres f commercial forest land that falls within big game winter ranges from November 15 through April, on 2,662 acres of commercial forest land that falls within big game parturition habitat from May 1 through June 30, and 22 acres of commercial forest land that fall within restricted habitats surrounding raptor nests and sage grouse leks from February 1 through July 31.

In total, the operational and seasonal restrictions would be applied to 4,767 acres or roughly 60 percent of the commercial forest land.

Summary

Under this alternative, there would be no specific annual sale quantity. The only times harvesting would be allowed would be to specifically and emphatically benefit wildlife, watershed, and/or recreation values, or to remove damaged or killed trees following a natural catastrophe. Consequently, lumber/wood product manufacturers/producers could not rely on the forest lands in the Green River Resource Area for a source of material. Management activities to maintain healthy, vigorous forest stands would not occur; therefore, a substantial increase in insect and disease would be expected over time. Because only minimal amounts of forest products would be sold under this alternative, the economic return to the government would be negligible. The overall impacts of this alternative to the forest management program, the forest resources, and the forest based economy would be high when compared to the other alternatives.

Hazardous Materials

The impacts would be the same as the Preferred Alternative. Hazardous waste spills and unauthorized dumping on the public lands would be immediately cleaned up by BLM or the responsible party to reduce resource impacts. Lands would be inspected prior to transfer out of public ownership or prior to acquisition to protect the public from contact with hazardous materials.

Water resources would be protected by testing produced water pits or drilling fluid pits if they show indications of containing hazardous wastes.

Lands and Realty

Public land users would be impacted by 665,490 acres set aside for avoidance, exclusion, and no surface occupancy, and 2,403,630 acres with seasonal restrictions due to recreation, cultural, visual, wildlife, and other resource values. Approximately 50 percent of all rights-of-way would be impacted by these decisions (Table 2-4; Table 2-5; and Table 2-29).

The majority of the exclusion areas are 10- to 20-acre petroglyph sites, and there would be no impact on rights-of-way. The exclusion of a ¼ mile corridor along the Sweetwater River wild and scenic river corridor and on Pine and Little Mountain would have minimum impact due to the lack of right-of-way activity in these areas; exclusion of rights-of-way in the Currant Creek drainage could have a significant impact on proposed Federal/County road construction along the Forest Service boundary if a new location on federal land for crossing Currant Creek is necessary. Rights-of-way in exclusion areas would not be allowed unless mandated by law.

Avoidance areas would have a small impact on rights-of-way except for those large areas within the Greater Sand Dunes ACEC (38,650 acres), South Pass Historic Viewshed/Landmark (87,580 acres), proposed Steamboat Mountain ACEC (43,010 acres), and the entire proposed Tri-State Monument ACEC (126,080 acres). To avoid these areas would require major reroutes.

Following Questar Pipeline Company's construction of Mainline No. 58 Pipeline Loop, it is proposed to close the existing right-of-way concentration area in the proposed Tri-State Monument ACEC to additional rights-of-way. This would preclude looping of the existing pipelines and construction of any new pipelines from the Clay Basin storage facility along the existing route. Realignment of the major highway and/or construction of an additional highway through the proposed Tri-State Monument ACEC is being contemplated, and these projects would be impacted by the avoidance/right-of-way exclusion decisions. Although there is not much activity in the South Pass Historical Viewshed/Landmark, Greater Sand Dunes ACEC or proposed Steamboat Mountain ACEC, any proposal to place facilities in these general areas may require major reroutes and extensive planning to limit impact to the resource values.

A total of 3,270 acres of actual candidate plant sites (including 160 acres on Pine Buttes) would be exclusion areas for rights-of-way. These small sites would not have an impact on right-of-way location. Candidate plant sites would be withdrawn which would preclude disposal or entry. An inventory would be required on 38,650 acres of candidate plant habitat prior to construction which would impact the timing of construction of rights-of-way as these inventories can occur only at certain times of the year.

Seasonal restrictions and other mitigation measures to protect resource values and threatened and endangered species (T&E) would impact rights-of-way. Approximately 60 rights-of-way may have to be rerouted or mitigated annually to protect cultural/historical, wildlife, and T&E values. Crucial wildlife habitat would impact the location or timing of rights-of-way construction. Wetland/riparian areas and floodplains also would impact the location of rights-of-way.

The possibility of high dust levels resulting from use of unpaved access roads would necessitate stipulations to control dust. All construction rights-of-way as well as access road rights-of-way would include a stipulation requiring that the holder meet Federal and State air quality standards.

Land tenure adjustments would occur only if the benefits outweigh any adverse impacts, and if there are no significant impacts which cannot be mitigated. A total of 13,043 acres have been identified as possibly suitable for disposal (Appendix 8-1). The ability to sell or exchange land and to issue Recreation and Public Purpose Leases and patents would benefit communities and industry. The sale or exchange of isolated tracts would result in the disposal of lands that are difficult to manage. Based upon past experience, it is anticipated that 3,000 acres would be sold, exchanged, or patented under the Recreation and Public Purposes Act over the next 20 years. Sale or exchange of lands may be necessary to accommodate the need for hazardous material or solid waste disposal sites. All lands must have a hazardous waste clearance prior to disposal which would increase the cost to the proponent or to the Bureau.

Existing withdrawals would be reviewed, and those which no longer serve the purpose for which they were withdrawn would be revoked. These lands (encompassing nearly 90 percent of the planning area) would then be open for entry, disposal, and mineral location. By revoking the withdrawals, it is possible that there may be a rush to file mining claims (Table 2-7).

The withdrawal of 279,324 acres of lands within ACECs and other special management areas would preclude disposal, entry, and mineral location (Table 2-6).

As part of the federal program to reduce the salinity and sedimentation of the Green River Basin, desert land entries or agricultural leases would be authorized only if such use meets the soils/water and Department of Agriculture criteria. This would have slight impact as little of the planning area meets the criteria for desert entry.

The acquisition of access would be required to protect and promote resource values (ACECs, recreation, timber and mineral sales, access to BLM improvements, etc.) (Table 2-8).

Summary

The majority of rights-of-way require short-term use of lands; long-term productivity is restored upon rehabilitation. Unavoidable adverse impacts could occur to rights-of-way management because of constraints for resource protection that impact the routes selected and the timing of construction. The greatest impact would be in those areas which would be managed as no surface occupancy areas and are listed as avoidance or exclusion areas for rights-of-way (Table 2-4).

Unavoidable adverse impacts could occur to rights-of-way management because of constraints for resource protection that impact the routes selected and the timing of construction. The greatest impact would be in those areas which would be managed as no surface occupancy areas and are listed as avoidance or exclusion areas for rights-of-way (Table 2-4).

Lands would be irreversibly lost to the public land base when sold or exchanged (about 13,043 acres). Under exchange, however, lands of comparable value would be obtained. Lands currently authorized as landfill sites or industrial ponds would be irretrievably committed to compatible uses. For example, landfill sites are susceptible to subsidence and methane gas leakage; therefore, any later surface construction must take these potential problems into account. Railroad rights-of-way or any rights-of-way requiring large amounts of earthwork may be irretrievable due to cost and complexity of rehabilitation.

Livestock Grazing

Vegetative treatment would occur on approximately 41,000 acres. Some impact to individual grazing permits could be expected due to prescribed burning because it could be necessary to limit numbers of livestock to provide a 2-year deferment of treated pastures or allotments. Approximately 169 AUMs would be lost over the next 20 years due to existing and new range improvements.

Elimination of new fence construction could cause riparian areas and desirable vegetation to be heavily utilized if livestock are not properly herded.

Avoidance of significant cultural sites, limitations on activities within ½ mile of historic trails, and subordination of activities to historic landscape values in some areas may constrain the BLM's ability to construct rangeland improvements aimed at achieving better distribution and management of livestock. Added survey and design costs may be necessary to avoid effects to cultural resources.

A surface impact would occur as a result of the collection of fossils. Any disturbed areas remove forage from livestock use.

In this alternative, conversion ratios from sheep to cattle could increase and the emphasis would be placed on other resource values. Therefore, after a conversion, there would be fewer cattle permitted than normal. In some areas, conversions from sheep to cattle may not be authorized and individual permittees could be forced to graze sheep.

Existing lands, minerals, wild horse, livestock grazing, and wildlife actions have removed livestock forage from approximately 40,418 acres which would be capable of supporting 3,368 AUMs. Management actions proposed over the next 20 years would remove forage from an additional 49,351 acres. In total, approximately 89,769 acres would be affected. During the next 20 years, an estimated 39,010 acres would be reclaimed. After reclamation, roughly 50,759 acres would still be out of vegetative production. The livestock forage loss associated with the unreclaimed lands would be 4,003 AUMs. Table 4-34 displays the forage/AUM losses by disturbance category.

Under this alternative, management actions for land and minerals would slightly reduce available forage in the planning area. Approximately 52,901 acres or 4,408 AUMs would be disturbed and not reclaimed over the next 20 years. This is approximately 1 percent of the available AUMs in the planning area. The loss would be considered minimal.

Long-term benefits would occur for completion and implementation of 42 AMPs on about 60 percent of the planning area.

In this alternative, no grazing would be allowed in the 970-acre Palmer Draw exclosure or any other special management exclosure. These exclosures were constructed as mitigation for recreation and wildlife during the Big Sandy Grazing EIS. There are roughly 1,900 acres or 160 AUMs inside exclosures.

Riparian habitat would benefit in this alternative. About 80 percent of the riparian areas would be in proper functioning condition by 1997. Riparian area management prescriptions in current and new AMPs would have to be more restrictive. Improvement of riparian habitat would become the primary management objective in I and M category allotments. This action could require that some permittees provide management actions, such as herder control of livestock. It may also be necessary to impose acceptable utilization levels on certain riparian areas and reduce active grazing preference or remove grazing from riparian areas to achieve stabilization. In most cases, closures to grazing this would last at least three years. However, it is estimated that only 5 percent of riparian areas would need this type of management. All other improvement could be brought about by strict control of livestock during the grazing season.

Rangeland improvements would be limited by restricting water developments in crucial wildlife ranges and fences in big game or wild horse areas. Intense herder control could become necessary to properly distribute and control livestock.

Participation in the Wyoming Weed and Pest program would be moderately beneficial to the livestock program by removing undesirable plants and increasing forage.

Some off-road vehicle users would continue to harass livestock and leave gates open.

TABLE 4-34

LIVESTOCK FORAGE/AUM LOSSES (ALTERNATIVE C)

Activity	Existing Disturbed Acres	Projected Disturbed Acres	Total Disturbed Acres	Reclaimed Acres	Net Disturbed Acres	AUMs Lost
Lands Actions						
Disposal	2,783	13,043	15,826	NA	15,826	1,087
Authorizations (R/Ws, permits, leases)	8,325[1]	7,493	15,818	7,000	8,818	735
Wild Horse						
Trap sites	62	30	92	0	92	8
Water development	0	15	15	0	15	1
Range Improvements						
Wells, pits, reservoirs	810	77	887	0	887	74
Wildlife						
Guzzlers	10	0	10	0	10	4
Exclosures	930	970	1,900	0	1,900	160
Mineral						
Oil and gas	10,435	13,828	24,263	14,293	9,970	831
Gravel pits	1,080[2]	—	1,080	—	1,080	90
Coalbed methane	140	3,010	3,150	1,927	1,223	102
Coal (6 mines)	13,918	10,560	24,478	15,790	8,688	724
Mine Sites (trona, jadeite, zeolite, gold)	1,920	325	2,245	0	2,245	187
Sodium wells	5	0	5	0	5	<1
Total	**40,418**	**49,351**	**89,769**	**39,010**	**50,759**	**4,003**

[1] Based on Resource Area estimates. Actual disturbance due to lands actions is not presently known (Haverly).

[2] Based on Resource Area estimates. Actual acreage of gravel pits is not known. It is estimated that the amount of disturbance will remain constant (i.e., new acres disturbed would be offset by acres reclaimed) (Porter).

There are 9 allotments (384,000 acres) that could be affected by surface disturbance (primarily oil and gas development) and geophysical exploration during the lambing period of May 1 to June 15. This disturbance could possibly cause an disruption of lambing which could cause death or bumming of the new born lambs. The 9 allotments are Lombard, Highway Gasson, Big Sandy, Sublette, Boundary, Poston, Reservoir, Prospect Mountain, and Little Prospect.

No surface occupancy stipulations for 3,110 acres of candidate plant locations would cause no known impact to livestock grazing management. However, no surface occupancy stipulations on 35,540 acres of potential habitat could prohibit rangeland project construction intended for better livestock management.

Management of major highways as Class II VRM areas could have an effect on livestock management by prohibiting project construction. Added survey and design costs may be necessary to meet VRM Class II standards.

No surface disturbance stipulations on 75,900 acres of the Sage/Currant Creek watershed and 55,800 acres of the Red Creek drainage would have an impact to livestock management. This action would prohibit construction of rangeland improvements and established management objectives may not be attained. Eliminating grazing from the Red and Sage Creek drainages within the proposed Tri-State Monument ACEC would severely effect livestock grazing management. The 800 acres of riparian habitat that is considered for no grazing until improvement would affect 10 percent of the active preference of 3,932 AUMs. This ACEC lies within the boundaries of 5 I category allotments which have or would have implemented AMPs. The 38,555 acres of proposed vegetative treatment in this area would result a short-term loss (due to rest of the treated areas) of forage available for grazing for two growing seasons.

Prohibiting livestock water developments in big game winter range could prevent established management objectives from being reached in some grazing allotments.

The elimination of predator control would not impact range management practices but could have an impact on individual livestock operations, especially those grazing sheep.

In specifically identified areas of no surface disturbance such as in the Steamboat Mountain special management area, the Oregon Buttes ACEC, the South Pass area, and candidate plant locations and potential habitat areas, construction of rangeland improvement projects would be prohibited and established grazing management objectives may not be achieved.

Increasing the strategic plan numbers of antelope in the Sublette antelope herd could have a major impact to livestock. Monitoring has not been completed or evaluated at this time to determine if there is available forage to support an increase. Any increase without supportive data could cause deterioration of the rangeland resources. Current populations of antelope (30,000) are supported with available forage primarily because livestock numbers have been down (50 percent voluntary nonuse) due to livestock market fluctuations.

Wild and Scenic river management would prevent increases in existing active preference or issuance of additional grazing permits due to increases of available forage. In addition, the elimination of range improvement construction within ¼ mile from the centerline of eligible segments due to no surface occupancy stipulations could prevent established management objectives from being reached.

The ½ mile no surface occupancy buffer around the White Mountain Petroglyphs site could prevent future rangeland development that might aid in the management of livestock and reaching the established objectives of the Sands AMP.

There would be no known impacts of conflicts with management actions proposed for the Pine Springs ACEC.

No surface occupancy stipulations in the Natural Corrals ACEC and a ¼ mile buffer of visual disturbance in the Cedar Canyon ACEC could prevent future rangeland project development. However, the allotment in which these ACECs lie is in an M category and no projects are proposed.

Utilization levels proposed for upland sites in the Greater Sand Dunes ACEC are not currently objectives of the Sands AMP or the Rock Springs Allotment. Grazing management plans and objectives for these allotments would have to be adjusted.

Summary

Losses of forage would occur due to mineral development activities, wildlife and wild horse projects, realty actions, and rangeland improvements affecting approximately 4,003 AUMs. Prescribed burning on 41,000 acres and wildfire would have a short-term impact on forage but should result in long-term productivity of forage.

No surface occupancy requirements affect project placement and development aimed at improving livestock distribution. This would have a long-term affect and livestock distribution problems would continue for both the short term and long term.

Surface disturbance on 9 allotments (384,000 acres) could disrupt lambing. Land disposals would be considered an irreversible irretrievable loss of forage.

Minerals

Oil and Gas

Table 2-29 shows acres of ownership and development potential for each of the types of lease restriction. The application of a no leasing restriction would remove 400,170 acres from potential opportunities for the exploration and/or development of oil and gas resources. Approximately 232,640 of these acres have high development potential, while 40,130 acres have moderate potential, and 139,950 acres have low development potential. These no leasing restrictions represent an approximate 400,170-acre increase in planning area lands covered by this restriction. This would increase the impact on oil and gas activities over existing management and result in fewer wells drilled.

The application of no surface occupancy stipulations would affect 366,010 acres of land with high development potential, while 102,820 acres of moderate potential and 298,560 acres of low potential would be affected. These restrictions represent an approximate 753,070-acre increase in planning area lands covered by this type of restriction. The affect of adding this stipulation to a lease would result in adding to the potential costs of drilling exploration and development wells by requiring relocation of well sites outside the restricted area and in some cases requiring the additional expense of pursuing directional drilling to access a reservoir. Also, in some parts of the planning area, the cost of drilling a directional well would be so high that wells would not be drilled because of economic considerations. In addition, the amount of land with a no surface occupancy stipulation, in some locations, would cover such a large area that companies would not have the technical ability to be able to drill wells to access areas in the middle.

The application of the seasonal restrictions to leases would affect 1,066,070 acres of land with high development potential, while 667,140 acres of moderate potential and 726,480 acres of low potential would be affected. These seasonal restrictions represent an approximate 2,403,630-acre increase in planning area lands covered by this type of restriction. The affect of adding this stipulation to a lease would result in reducing the amount of time that exploration, development, and production activities can occur in each year. Activity would be concentrated into shorter time periods, increasing costs to those developing the resource.

Surface disturbance restrictions would affect 668,040 acres of land with high development potential, while 211,220 acres of moderate potential and 624,310 acres of low potential would be affected. These surface disturbance restrictions represent an approximate 1,261,060-acre increase in lands covered by this type of restriction. The affect of adding this type of stipulation to leases results in increased costs of drilling to mitigate impacts or relocating to avoid the restriction. In some cases, the cost of mitigation would be so high that the development activity would no longer be economic to pursue.

The adverse impacts to oil and gas development would be greater than under existing management (Alternative A). In the planning area, 32 fewer wells would be drilled between 1990 and 2010. Of these 32 wells, 6 would be located in the Nitchie Gulch Special Study Area, while the other 26 would be scattered throughout the planning area. This would result in reduced production of 77,610 barrels of oil and 2,920,125,000 cubic feet of gas, over this period.

Restrictions in the area of high coalbed methane development potential would have the same impacts as for oil and gas development and would result in 50 fewer wells than under existing management. This is a result of the significant number of restrictions, including no leasing, under this alternative.

Cost of geophysical activities would also be increased, with some activities being limited to certain times of the year or displaced from areas of conflict with other resource values. In some parts of the planning area, restrictions would limit the amount of seismic that can be performed so that complete analysis of the potential resource would not be available before drilling activity occurs. Impacts to geophysical activities would in general be increased over the present situation.

Coal

If the present proposed coal mine areas would not be allowed, a loss of 182.9 million tons of coal to the national and area economy would result, as well as a royalty loss to the State of Wyoming and the federal government. If the coal mineral program is not allowed, reasonable development of the resource would begin to decline in 1999. This would result in a loss of existing revenues to the area economy and to the State and federal governments. If allowed to continue to decline without consideration for the need of proper lead times for new mine start-ups, coal mining in this area could be nonexistent within 25 years, and could impact coal resource users along with increasing cost of local energy needs as they would have to be produced from other areas.

Local and interstate coal users would be impacted from the lack of additional low sulphur coal suppliers and would have to eventually seek coal from outside the immediate area. Coals with higher sulphur content may have to take the place of the low sulphur coals adding additional environmental costs. Nationally, the loss of these coal supplies could raise dependance upon foreign markets.

Major impacts to the coal program come from wildlife where large areas of crucial winter range are identified within the planning area. Some areas are removed from mineral development, or restrictions are placed on mining operations such as no surface occupancy, or mining is limited to underground operations. Mitigation for loss of habitat raises the cost of coal recovery potentially raising prices to the consumer or making the project uneconomic. Cultural resources would inhibit mining if coal is an adverse impact to cultural, natural history, or paleontology resource; coal operations would be excluded from surface occupancy or surface mining, and underground mining would be excluded in some areas. Candidate plant species would eliminate leasing in the identified areas. Cost of mitigation in avoidance of these resources leaves coal unmined, thus the coal resource is forever lost as it becomes uneconomic to return and mine the isolated coal zone.

Visual, air, and water resources impact coal development by increased costs in mitigation. Riparian and wetland areas would be managed to enhance other resource values also increasing coal development costs. These costs are passed on to consumers of the coal resource.

Surface coal mining is prohibited in WSAs and some ACECs. The coal resources within these areas would be lost to the nation's energy needs is subsurface mining is not feasible.

Sodium/Trona

Impacts to sodium are from air, water, and visual resources. These resource objectives often increase the cost of sodium development and may inhibit further development in the northern known sodium leasing area.

Locatable Minerals

Additional withdrawals impact mineral location activities the most. Public land withdrawals bar a potential claimant from locating a mining claim on public lands. ACEC lands open to claim activity would affect the mining law program to a lesser extent. Potential claimants are not barred from locating mining claims, but any activity other than casual use requires a Plan of Operations and the posting of a bond. Approximately 371,236 acres of existing and proposed ACECs would affect locatable minerals.

Approximately 5,246 acres of existing withdrawals would remain in effect, and remain unavailable for mineral location.

About 3 million acres of existing withdrawals would be revoked, and would become available for mineral location which would result in a benefit to mineral location activities.

Approximately 279,324 acres would be withdrawn, resulting in a net of 284,670 acres (or about 8 percent of the planning area) being withdrawn in the long term. Locatable minerals would not be developed in these areas but this affect would be offset by the large acreage of withdrawals to be revoked. Approximately 227,600 of the 284,670 acres are a part of the 3 million acres already withdrawn and no change in current management would occur in those areas resulting in about 57,070 newly withdrawn acres that were previously open to mineral location.

Designating the South Pass Historic Landscape as an ACEC would mean that 87,540 acres of public lands would be unavailable for Notice level operations; that is, any surface disturbing activities under the locatable minerals program would require a Plan of Operations (including a reclamation bond). This would place a slight limitation on locatable minerals exploration and development by requiring an environmental assessment and reclamation bond on any locatable mineral activity other than casual use.

Mineral Materials

Opportunities for sales would be lost on about 259,327 acres (see Table 2-13). This is a small portion of the planning area and should not significantly affect the availability of mineral materials area wide.

Areas of surface occupancy are the same as those listed in Table 2-29. This table also lists areas where no surface disturbance is allowed. These no surface occupancy and no surface disturbance areas would adversely impact the use of mineral materials. While mineral material sales may not actually be prohibited in these areas, it is impractical to remove mineral materials from these areas without disturbing or occupying the surface in the process. Mitigation measures would increase the costs of doing business, limit timing of activities, and may preclude some activities.

The disposal of mineral materials from existing sites (i.e., community pits and other disposal sites) would eventually result in the depletion of these same sites, necessitating the establishment of new sites.

Moss rock resources in certain specific areas may be depleted from allowing moss rock common use areas. Topsoil resources would be conserved in response to the recommendation not to establish topsoil sale areas. Allowing blowsand sale or common use areas should have a negligible impact on the total amount of sand resources in the planning area.

Establishment of moss rock or blowsand community pits or common use areas may eventually result in the depletion of these resources within the boundaries of the pits.

Areas of no surface occupancy or seasonal restrictions would be listed in Table 2-29. This table also lists areas where no surface disturbance would be allowed. These no surface occupancy and no surface disturbance areas would adversely impact the use of mineral materials. While mineral material disposal may not be specifically prohibited in such areas, it is impractical to remove mineral materials from an area without either disturbing or occupying the surface in the process.

Summary

Oil and Gas

Short-term and long-term affects would occur to mineral production and management by closing about 398,680 acres to leasing. No surface occupancy requirements and restrictions on surface disturbance would increase the costs of doing business and possibly preclude some activities.

Approximately 517 billion cubic feet of gas and 13.7 million barrels of oil would be produced during the 1991 through 2010 time period. This production would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Coal

Short-term and long-term affects would occur to coal leasing and development due to 12,600 acres determined unsuitable for leasing, and 418,300 acres unacceptable for further leasing consideration. Increased costs of mitigation would have short- and long-term affects on coal production activities by increasing costs and limiting development.

Approximately 297.05 million tons would be produced which would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Sodium/Trona

Long-term benefits would occur with the entire area being open to leasing. However, short- and long-term affects would occur through the increased costs of mitigation.

Approximately 115 million tons would be produced which would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Mineral Materials

Increased costs of mitigation (about 665,000 acres of no surface occupancy, and 259,327 acres closed to salable minerals) would increase costs of doing business in both the short and long term. Some unauthorized use would continue. Materials sold would be an irreversible irretrievable loss of the mineral resource but would provide an economic benefit.

Locatable Minerals

Approximately 3 million acres of withdrawals would be revoked while 276,334 acres would be subject to new withdrawals. Some lands would be open for development while others would be closed. This could have a short- and long-term affect on the development of locatable minerals. The increased costs of mitigation would affect locatable mineral development also. Additional requirements and mitigation for ACECs would increase costs of doing business for both short- and long-term periods.

Geophysical

Areas closed to geophysical activity would result in a loss of data through the long term, and would be an unavoidable adverse impact. Increased costs for mitigation would affect operations in both the short and long term. Areas open to vehicle use and exploration activity provide beneficial long-term affects because retrieval of information is allowed. More areas would be closed to vehicle use under this alternative and effects would be greater than Alternative A.

Off-Road Vehicles

The general affects to off-road vehicle travel and users from rights-of-way, fences, acquisitions, WSAs, and seasonal closures would be the same as under Alternative A.

About 2,944,610 acres of public lands in the planning area would be limited to existing roads and trails; 464,340 acres would be limited to designated roads and trails; 214,835 acres would be closed to vehicle use; and 1,671,040 acres of existing and designated roads and trails would fall under seasonal closures (see Table 4-24). These constraints on ORV travel would be greater than Alternatives A or B.

The 10,500-acre "open" area in the Greater Sand Dunes ACEC is the only ORV play area in the planning area which would continue to provide long term benefits to off-road vehicle users.

Closing areas permanently or through seasonal closures could displace ORV users to other areas. Some wildlife viewing opportunities in the Steamboat Mountain area would be lost during the closures.

These areas (see Table 2-31) are partially closed or closed all together from ORV travel which displaces users: candidate plant areas, Cedar Canyon ACEC, Natural Corrals ACEC, Oregon Buttes ACEC, Pine Springs ACEC, Pine Springs Expansion Area, Red Creek ACEC, within the Tri-State Monument Proposed ACEC, and White Mountain Petroglyphs ACEC. These prescriptions would displace users from about 54,695 acres or 2 percent of the planning area.

The implementation of the "limited to existing roads and trails" and "designated roads and trails" designation may pose conflicts in some areas; however, the density of existing roads and "two-track" trails provides access to essentially all of this area. The condition in the "limited" definition would not impact existing uses.

Summary

Long-term benefits would result from the large amount of area available on existing roads and trails for off-road vehicle use and 10,500 open acres. Additional areas closed to off-road vehicle use would reduce useable areas for off-road vehicles and restrict vehicle access.

Recreation

The impacts of cultural resource actions would be the same as Alternative A.

Forested lands would be managed to maintain the current levels of forest cover. Existing wildlife populations would be maintained and a slight increase in hunter or recreation user days would be anticipated. Benefits to the recreation uses would essentially be the same as under Alternative A; however, the quality of the recreation resources would receive a higher level of protection.

Not allowing new recreation sites to be developed within 500 feet of riparian areas and floodplains would adversely impact recreation development potential.

The implementation of lands management actions would have a beneficial impact on recreation resources. The result would be to raise the importance and priority that recreation-related or benefiting realty actions would receive. Public access needs and land exchanges for public benefit could be actively pursued and processed. This, combined with a continued protection of the existing recreation resources, would result in a higher level of use available for recreation purposes, fewer conflicts with landowners, and higher quality experience for the recreating public.

The application of oil and gas leasing stipulations not allowing surface occupancy on developed and semi-developed recreation sites and not allowing surface disturbance within one-quarter mile of those sites would benefit those sites. Implementation of these stipulations is essential to public safety and necessary for protection of the integrity of recreation sites.

Developing backcountry byways would provide opportunities to interpret diverse resources.

The implementation of the ORV restrictions would primarily impact recreational off-road vehicle uses and are discussed under Off-Road Vehicle Management. The impacts to other recreation uses are secondary and for the most part tied to wildlife populations. Big game population increases could increase hunter use and benefit recreation uses.

The camping limit of 14 days within a 5-mile radius may inconvenience some users. The limit would help to maintain the quality of the planning area for recreation. Closing crucial wildlife and livestock waters to camping may inconvenience some users but would assure protection of resources.

Special recreation permits and the accompanying mitigation would assure resource protection and public safety.

Recreation area management plans, recreation project plans, the Green River "greenbelt," protection of the Continental Divide Snowmobile Trail, and protection of Boar's Tusk, Pilot Butte, Emmons Cone, and the 14-Mile recreation area would enhance the recreation program.

Prohibiting new recreation sites in riparian areas may limit recreation opportunities in some cases.

Potential safety hazards and incompatible uses on recreation sites would be avoided by: 1) withdrawing these sites from mineral entry, 2) prohibiting surface occupancy by surface-disturbing activities, 3) restricting livestock grazing, and 4) prohibiting surface disturbance within ¼ mile.

Recreation resources would benefit from proposed visual resource management because sensitive recreation use areas would receive optimum protection.

The improvement of wildlife habitat through vegetation treatment of 40,984 acres may lead to increased wildlife populations which in turn may result in additional hunter days. The treatment of an additional 41,000 acres for livestock management would also benefit wildlife and may result in a further increase in hunter days.

The management of wildlife populations at current or slightly increased levels would have the effect of allowing hunter days and angler days to essentially continue at their current level or possibly increase and would be an important benefit to the local community. The specific wildlife management actions identified pose no specific conflicts with the recreation programs.

The addition of a wild horse viewing area in the planning area would greatly increase public awareness of that program and allow BLM to interpret other resource programs including recreation.

Summary

It is anticipated that recreation use days would increase by approximately 60 percent over 20 years due to historical trends of the population fluctuation due to the mineral industry.

Long-term beneficial impacts would occur to recreation users as dispersed recreation use increases and existing facilities are improved.

Socioeconomics

Related socioeconomic tables are located in Appendix 10. Other economic tables, graphs, and charts which were used for the analysis in the document are on file at the BLM Green River Resource Area in Rock Springs, Wyoming.

Livestock

Impacts are the same as those addressed in the Preferred Alternative.

Recreation

Comparing 2010 to 1990 and Alternative A

Under this alternative, annual recreation day levels would rise by about 2,722 days each year over the next 20 years. By the year 2010, annual recreation days are projected to total 131,761, valued at over $9.53 million per year. This is about 54,444 recreation days and over $4.1 million higher per year than is estimated for 1990, or for Alternative A in the year 2010. Total Area output (direct, indirect, and induced) could be enhanced by about $19.58 million from recreation, surpassing 1990 benefits and benefits of Alternative A in the year 2010 by over $8.43 million.

Direct annual income from recreation is estimated to reach almost $3.18 million, surpassing that of 1990 or Alternative A in 2010 by almost $1.37 million. Also, total annual income (direct, indirect, and induced) related to recreation in the resource area in 2010 is estimated at about $4.93 million, topping Alternative A by over $2.12 million.

Direct annual recreation sector employment would be about 367 FTEs, 158 FTEs higher than in either 1990 or in 2010 under Alternative A. The total (direct, indirect, and induced) recreation related employment in the Area in 2010 under Alternative C (510 FTEs) would top 1990, as well as the Alternative A 2010 level, by almost 220 FTEs.

Summary

Direct expenditures for recreation under Alternative C would cumulate to almost $151.62 million, which is almost $43.1 million greater than under Alternative A. This could add about $311.5 million to total cumulative economic output by 2010, which is over $88.53 million more than Alternative A.

Direct cumulative income from recreation is estimated to total over $50.59 million, almost $14.38 million higher than under Alternative A. Recreation could enhance total cumulative area income (direct, indirect, and induced) by about $78.37 million over the 20 years, surpassing Alternative A by over $22.27 million.

Timber

Impacts are the same as those addressed in the Preferred Alternative.

Sodium/Trona

Impacts are the same as those addressed in the Preferred Alternative.

Oil and Gas

See discussion under Preferred Alternative.

Coal

Annual Perspective

The highest total resource area coal production is projected to occur in 1998 at approximately 16 million tons, valued at close to $286 million. This level of coal output is estimated to produce additional indirect and induced benefits to total area output of almost $228 million, for a total benefit approaching $513 million. Projected output in 2010 is 11.3 million tons with an estimated value of slightly over $201 million. The benefit to total area output (direct, indirect, and induced) could amount to over $361 million that year.

Direct personal income to area coal sector households in the peak year of 1998 is projected to total about $51 million and benefits to total area personal income (direct, indirect, and induced) from coal activities that year are estimated at slightly over $92 million. In 2010, direct personal income to area coal sector households is projected at about $36 million and benefits to total area personal income from coal activities in 2010 are expected to be about $65 million.

Direct employment by the coal sector in 1998 is projected at 939 FTEs, the same as in the base year. With the projected end to the production from the Lion Coal mine after 2001, this direct employment is expected to decline below 939 and to reach about 886 FTEs by the year 2010.

Total area employment (direct, indirect, and induced) in 1998 is estimated to benefit by 2,442 FTEs from coal activity that year and by about 2,305 FTEs in the year 2010.

Summary

Cumulative coal output under Alternative C over the next 20 years is projected to total 297 million tons, 28 million tons less than projected for the Preferred Alternative and Alternative A, and 43 million less than under Alternative B.

The estimated direct output value of this cumulative 20-year coal output is about $5.3 billion, which is about $496 million under the 20-year estimates for either the Preferred Alternative or Alternative A and a projected $774 million under Alternative B.

Total area output (direct, indirect, and induced) could benefit by over $9.5 billion as the result of the 20 years of coal activity projected under Alternative C. This is expected to be about $890 million less than could be realized under the Preferred Alternative or Alternative A, and almost $1.4 billion under total benefits to area output expected under Alternative B.

Direct personal income accruing to coal sector households from the level of coal activity projected over 20 years under Alternative C is estimated to be around $945 million, which is about $89 million less than under the Preferred Alternative or Alternative A and $138 million below expectations under Alternative B. Total area personal income generated by the level of coal activity projected over the 20 years under Alternative C is expected to total close to $1.7 billion, $160 million less than total income projected under the Preferred Alternative or Alternative A and $250 million less than that projected under Alternative B.

Coalbed Methane

Impacts are the same as those addressed in the Preferred Alternative.

Vegetation

Management actions implemented to control dust would allow vegetation to be more productive and vigorous in areas adjacent to roads. Other impacts are the same as those described for Alternatives A and B.

Prescribed burning would cause a long-term decrease in shrub species, a short-term increase in annual weeds, and a long-term increase in grass species on 40,984 acres. Other impacts are the same as those described for Alternative A.

Under this alternative, forestry management actions on commercial, noncommercial, and woodland stands would improve stand age class structure, health, and vigor. Management actions under this alternative are generally beneficial to overall vegetation management.

Impacts to vegetation from mineral activity are generally expressed in terms of AUMs lost or temporarily removed pending reclamation. These impacts are addressed in the livestock grazing management section. Effects on vegetative resources from management actions associated with minerals management are generally the same as those described for Alternative A.

Management actions described for ORVs, recreation, candidate plants, visual resources, and watershed management are more restrictive than those described for Alternatives A or B. Therefore, there would be less impact to vegetation under this alternative.

Management actions described for cultural/paleontological resources, lands and realty, livestock grazing management, wilderness areas, special management areas, and wild and scenic rivers would cause the same impact to vegetation as Alternative A.

With an increase in the number of wild horses, range conditions in wild horse herd management areas would decline and the amount of forage available for livestock and wildlife would decline. Designation of the Little Colorado Desert as a wild horse herd area would not impact existing vegetation because the horses are presently there anyway.

Increasing the Sublette antelope herd to greater than the current population could cause overutilization of browse on antelope crucial winter range.

Summary

There would be a short-term increase of annual weeds and a short-term decrease in vegetation production on the 41,000 acres proposed for prescribed burns. However, there would be a long-term increase in grass species and vegetation production. Wildfire would create a similar affect for both short and long term.

A short-term impact would occur from the construction of rangeland improvement projects removing vegetation (about 105 AUMs); however, a long-term benefit to overall vegetation production through improved distribution would occur. Riparian areas should improve in the long term.

Approximately 20,150 acres of mostly low density sagebrush would be lost over the long term due to development activities. In specific areas this could be important but planning area wide it is not expected to be significant.

Land disposals would result in an irreversible and irretrievable loss of the vegetation resource as most disposals are for urban expansion or industrial development.

Visual Resousrces

Managing BLM-administered public lands in accordance with VRM standards to protect, maintain, enhance, and rehabilitate visual resource values would maintain and in some cases enhance VRM classifications. Management of about 500,000 acres (or 14 percent of the planning area) for Class II values would benefit overall visual values over Alternative A. Management of Class III areas would be similar to Alternative A. Reduction in the amount of area (about 75,000 acres) managed for Class IV visual values would provide a benefit to visual resources.

Protecting National Historic Trails by allowing no disturbance within ½ mile or within the visual horizon (whichever is less) of any contributing trail system would benefit visual resource management (VRM) by ensuring that scenic values would not be impacted. The application of a "no surface occupancy" stipulation to significant cultural resource sites would help to protect the visual sensitivity of those sites.

Managing woodland forest to enhance or maintain other resource values including scenic values would enhance VRM by securing current VRM classes, and in some cases, improving classes. Limiting clearcuts to 25 acres or less would help protect VRM classifications.

Leasing the Wind River Front with no surface occupancy in certain areas, and including prescriptions to protect visual resources would help maintain the Wind River Front as a Class II area.

Restricting permanent facilities to at least 100 feet from riparian areas and floodplains and maintaining a vegetative buffer between developed recreational facilities and live water would enhance the VRM values of the areas. However, minor adverse visual impacts would occur in riparian areas from intensive livestock use. These should decrease in the long term as practices are implemented to improve riparian areas.

Treatment units within VRM Class II areas would not exceed 40 acres in size, and no more than 10 percent of the area would be treated over the next 20 years. This would secure that these areas would remain as Class II areas.

In designated special management areas, such as ACECs, a plan of operation is required for any surface disturbance activities, regardless of acreage involved. This would greatly enhance the protection of VRM classes on about 570,966 acres or 16 percent of the planning area.

The establishment of the majority of the area as having off-road vehicle use limited to existing roads and trails would be compatible with the visual designation and in some cases prevent the degradation of the visual quality resulting from new disturbances and roads.

Recommending approximately 9.7 miles of the Sweetwater River as suitable for inclusion in the Wild and Scenic River System would maintain the integrity of the visual classifications for those areas.

Management for scenic segments and prescriptions for the Big Sandy River would protect scenic values within ¼ mile of the centerline of the river corridors.

Summary

The overall impact to visual resources in the planning area would be to provide protection to the more sensitive viewsheds in the area and provide a more accurate rating of the visual management needs of the entire area. The initiation of a program to improve the visual quality of oil field areas would benefit the visual resources in those areas, and in many cases, would benefit other resources such as soil, watershed, and vegetation.

Under Alternative C, there would not be any changes to existing VRM classifications.

Long-term benefits would occur from improvement of VRM rehabilitation areas to Class IV or above. Linear facilities such as roads and pipelines, would have a long-term affect on visual resources due to their high visibility and the extended periods of time for natural vegetation cover to become re-established.

Short-term effects would occur to visual quality from smoke associated with prescribed fire and wildfire and the subsequent modification of vegetation, and dust from development and logging activities. Reduced air quality from development and natural causes would have an individual short-term affect. Approximately 67,860 acres would be disturbed over the next 20 years and about 27,600 acres would remain disturbed over the long term. The level of affected air quality cannot be determined but is not anticipated to be significant for the whole planning area.

Watershed/Soils

Fire suppression would cause soil erosion in burned areas at rates dependent on the intensity of the fire and suppression efforts. Full suppression could lead to soil losses of up to 15 tons per acre. Prescribed burns generally affect soil much less than firefighting efforts. Soil loss may increase immediately after the burns due to the removal of vegetation. However, productivity should increase 2 to 3 years after burning with accompanying reductions in soil losses.

There would be controlled timber harvest on the Wind River Range with an emphasis on watershed without augmenting stream flows above capacity. The only possible problem which might develop is an uncontrolled road system pioneered by firewood cutters.

Rejuvenation of aspen by fire on Pine Mountain and Little Mountain may create more mass wasting but with a well conceived plan and temporal and spacial layout of the burns or treatments this may be avoided.

Although timber harvest is a minor activity, public demand for firewood is not. This activity has an associated high road density which routes storm runoff causing rill and gully formation on and below the road. This provides more sediment transport and erosion than that of a natural condition.

Land actions such as rights-of-ways for linear actions such as pipelines, roads, etc., can adversely affect watershed resources. Because of the extent of these rights-of-way and the related runoff a very large amount of sediment, salt, and phosphate are produced from the erosion occurring on them. Table 3-16.

Excess AUMs would be reserved for watershed and soils. This action would relieve grazing pressure on the riparian zones provided that wildlife populations would not increase in numbers beyond Wyoming Game and Fish Department strategic plan levels.

The implementation of grazing systems should improve distribution and use, thereby reducing runoff, compaction, and subsequent soil loss. The development of AMPs should result in long-term beneficial impacts to soils although short-term soil loss may increase as a result of range improvement projects such as vegetation manipulation.

Impacts from this activity affect every facet of water resources be it: sedimentation, salt and phosphate loading, groundwater contamination, bank and channel stability, loss of aquifers, retort leachate production, augmented flows, and water disposal.

The single largest impact to the water resources from surface disturbing activities associated with minerals activities is erosion and the resultant salt, sediment, and phosphate production. These activities include roads, drill pads, gravel pits, surface mining, borrow pit, etc.

The possibility exists for groundwater contamination from improper casing and cementing operations, undetected or unreported spills, or leachate migration from trona settling ponds and produced water pits. In addition, dewatering of aquifers during the production of coal or coalbed methane can adversely effect both quantity and quality of groundwater since such large areas are dewatered and the produced water is either re-injected or evaporated.

Soil contamination from drilling fluids and accompanying chemicals for production drilling continue to threaten area soils. Unlined reserve pits offer no protection from contamination to surrounding soils. Burying drilling muds in reserve pits has the potential of limiting soil development and fertility. Oil base drilling muds can contain benzene or other hazardous chemicals.

Strip mining of coal has some unique impacts associated with it. The most important impacts are the complete recontouring and denuding of the landscape and the backfilling of industrial wastes associated with mining into the open pits. The result of the recontouring and denuding can create a situation that augments flood flows unless retention ponds are used. These flows if allowed to go unchecked can force stream channels in the area to regrade themselves in response to such flows. This quite commonly results in incision and widening of the stream bed thus causing more sedimentation, salt, and phosphate loading.

Strip mines are required to operate under a quasi no-runoff regime by using a series of check dams, sediment ponds, contour furrows, french drains, or a combination of these coupled with a reclamation and revegetation plan. Based on these requirements, strip mining of coal would have little noticeable effect on water quality.

Shaft mining of coal could require mine dewatering. In this case, an NPDS permit would have to be filed and the resultant sedimentation would probably would have to be tolerated.

Off-road vehicle use can often impact the water and soil resources if done in an uncontrolled manner. The largest impact from off-road vehicle use is sediment production and erosion from uncontrolled streams crossings, two-track roads, and riparian area compaction from numerous poorly placed 4-wheel drive roads.

Less emphasis would be placed on this use and existing use would be controlled thereby reducing the potential for increases in sediment, salt, and phosphate contributions to the Green River.

Recreation centered around bodies of water can lead to the trampling and degradation of banks and riparian areas. Distance restrictions for camping would protect the riparian areas and stream channel banks.

Impacts from vegetation removal by fire or other means can have adverse impacts on stream hydraulics. Vegetative removal can cause an augmented flow regime which forces the stream channel to readjust its width and depth to accommodate the larger flows. This produces an unstable stream which would produce large amounts of sediment, salt, and phosphate.

Vegetation manipulation to enhance wildlife habitat would cause minimal localized short-term impacts to physical and chemical characteristics of soils, increasing erosion susceptibility through the loss of both ground cover and litter accumulation. Over the long term, vegetation should increase over pretreatment production levels which would decrease the erosion hazard. The proposed burn on Little Mountain could influence the dynamics of unstable soils causing mass movement on unstable landscapes. This action would create a large sediment, salt, and phosphate problem.

Summary

Long-term benefits would occur to watershed resources from mitigation measures and particularly no surface occupancy areas preventing disruption of soil and watershed values. Additional prescriptions to protect watershed and to manage special areas would reduce watershed impacts and provide an added benefit.

Some sediment loading and overuse due to livestock would continue over the long term but would decrease from current levels.

Revoking withdrawals would allow locatable mineral development which could cause an increase in sedimentation and siltation.

Wild Horses

Under this alternative, wild horses would benefit. Controlled water facility (i.e., wells) development would be allowed in antelope winter range. Approximately 40,989 acres of vegetative treatments would be conducted and improvement of plant diversity for wild horses would be achieved. No new fences in wild horse areas would be allowed thereby facilitating their protection and free roaming nature. Information signs would be placed within the planning area to promote the wild horse program.

Forage increases that would come from the intensive management would be allocated to wild horses and wildlife before livestock.

The existing wild horse management plans would be updated to improve the existing objectives for habitat and herd improvement. Increased management of the horses due to new developments in fertility and herd control would improve the overall herd condition and establish a 2-year rotation of gathering.

There would be no impact to wild horses due to management of air quality, recreation, and forestry.

Avoidance of significant cultural sites, limitations on activities within ¼ mile of historic trails, and subordination of activities to historic landscape values in some areas may constrain the BLM's ability to construct rangeland improvements aimed at achieving better distribution of wild horse grazing. Added survey and design costs could be necessary to avoid effects to cultural resources.

Under this alternative, management action for lands and minerals would slightly reduce available forage. The acreage disturbed for the 20-year period would amount to approximately 50,759 acres or 4,003 AUMs. This is approximately 1 percent of the available AUMs in the planning area. The loss would be considered minimal.

In this alternative, impacts or conflicts to wild horses due to livestock grazing would be minor because livestock actual use levels are expected to range from 180,000 to 200,000 AUMs annually.

Request for conversions of kind of livestock would be based on current management prescriptions in each wild horse management area and the presence of crucial wildlife winter range.

The 15,072 acres of unallotted forage could benefit wild horses if allocated to wild horses.

Proposed range improvements projects would remove approximately 8 AUMs of forage that is currently available for wild horse grazing.

In this alternative, approximately 1,960 acres or 160 AUMs would be removed from grazing in the existing special management exclosures. This action would not impact wild horses.

In this alternative, 80 percent of the existing riparian habitat would be improved by 1997. This action would require implementation of intensive grazing management in the wild horse management areas where riparian habitat exists. Riparian area improvement would primarily be accomplished through intensive livestock grazing management. Wild horses could be impacted due to proposed utilizations levels in riparian areas. Water sources would have to be developed to properly distribute wild horse grazing patterns and herds may have to be moved away from riparian areas by mechanical means.

The current conflicts for forage between wild horses and wildlife would continue if wildlife populations remain over strategic plan numbers. The competition for forage between antelope and wild horses would remain high in the Sublette antelope herd winter range and could become severe if the actual numbers of antelope are accepted as the new strategic plan number for this herd area.

Off-road vehicle use would continue to cause some impacts, particularly with harassment of wild horses.

The 6 developed and 5 undeveloped recreation sites would cause no impact to wild horses.

No surface disturbance stipulations in the Sage/Currant Creek area, the South Pass Area, and actual and potential candidate plant locations could prevent project construction aimed at achieving better wild horse grazing distribution in wild horse herd management areas.

The restriction of water development in big game winter range could impact the BLM's ability to manage horses and improve their habitat by better distributing wild horse grazing in the herd area.

The ½ mile buffer of no surface occupancy in the Natural Corrals ACEC should not cause an impact or conflict to wild horse herd management.

Utilization levels proposed in the Greater Sand Dunes ACEC could cause impacts to wild horse management. Water sources would have to be developed to properly distribute wild horse grazing patterns and herds may have to be moved away from areas by mechanical means.

The no surface occupancy stipulations over the majority of the Oregon Buttes ACEC could prevent project construction aimed at achieving better grazing distribution patterns of wild horses.

A very small portion of the Salt Wells herd area falls within the proposed Tri-State Monument ACEC but there would be no known impact or conflicts.

Wild horses would be placed under stress as a result of being captured. Some horses may be killed or injured. However, according to past experience, this number would be less than 1 percent of the horses gathered.

Summary

Short-term and long-term losses of forage would occur due o development activities, material sales, and rangeland improvements affecting approximately 4,003 AUMs. Prescribed burning on 41,000 acres and wildfire would have a short-term impact on forage but should result in a long-term increase in productivity of forage.

No surface occupancy requirements would affect project placement and development aimed at improving wild horse distribution (107 acres). This could have a long-term effect and distribution problems would continue for both the short term and long term.

Approximately 30 AUMs would be lost over the long term due to construction of range improvements in wild horse herd areas. Development of 15 water facilities would provide a long-term benefit to horses by improving distribution patterns. A short-term vegetation loss would occur during construction.

Wildlife

Impacts described in the Preferred Alternative would be the same under this alternative from management of Steamboat Mountain and Boar's Tusk-Killpecker Dunes, 25-acre forest clearcuts, communication site development, rights-of-way within Currant Creek and Red Creek ACEC, Palmer Draw, oil and gas development in Nitchie Gulch area, coalbed methane development, sodium development disturbance, gold mining, jade mining, zeolite mining, ORV prescriptions, recreation, vegetation treatment in riparian areas, and visual resource management.

Adverse impacts to the wildlife resource from timber harvest should be minimal.

The current grazing preference objective of 180,000 to 200,000 AUMs would not increase and would be maintained or decreased potentially resulting in beneficial impacts to wildlife. More monitoring to determine forage allocations would be initiated which would also benefit wildlife habitat, especially in areas considered unsuitable for livestock grazing.

Riparian habitat in proper functioning condition, after 10 years, would be increased to 80 percent increasing riparian/wetland recovery, compared to the Preferred Alternative.

No new fences would be built solely to benefit livestock or would be constructed in big game use areas. Since any fence design or placement may adversely impact some wildlife forms, the beneficial and adverse impacts would be analyzed prior to any fence authorization. Fences on public lands would continue to cause direct and indirect wildlife mortality. Even properly designed fences create a hazard to sage grouse, raptors, waterfowl, and non-game species.

No water developments would occur in crucial big game winter range which would have beneficial benefits to wildlife. No new water developments would be constructed solely for livestock, also resulting in beneficial benefits to wildlife and their habitat.

Not allowing conversions from cattle to sheep could adversely affect wildlife. Elk winter range habitat would benefit under this scenario because of the dietary overlap between cattle and elk. Sheep to cattle would have adverse impacts to elk but would benefit antelope or deer. Cattle to sheep would benefit elk but have adverse impacts to deer or antelope.

All unallocated forage (15,100 acres) would be reserved for wildlife, wild horses, and watershed purposes. This would benefit wildlife and have beneficial impacts to wildlife habitat.

Future oil and gas activities may impact approximately 229 raptor nests, 900 acres of sage grouse nesting habitat and cover, and 7,216 acres of big game crucial winter range. This would most probably occur within the Greater Nitchie Gulch (765 acres), Little Colorado Desert (1,525 acres), and Wamsutter Arch (555 acres) oil and gas fields. The remainder of the planning area could have 4,367 acres of disturbance within crucial big game winter ranges. Percentages of big game habitat in each area are the same as discussed in the Preferred Alternative.

Actual wildlife habitat lost over the next 20 years due to oil and gas development would amount to 4,012 acres in the Little Colorado Desert, 3,084 acres in Wamsutter Arch, 823 acres in Greater Nitchie Gulch, and 12,056 acres in the remainder of the planning area (total of

19,975). These acreages would not be fully reclaimed and portions would remain out of useable habitat wildlife for 20 years or more. Limited rainfall, poor soils, and severe winter conditions make reclamation difficult, increasing the time required to re-establish suitable vegetation to pre-disturbance composition and density.

Seasonal stipulations would not provide adequate long-term protection for wildlife. Development of long-term land use activities would continue to displace wildlife and disrupt nesting/fawning areas during operation of the activity.

Mining and associated activities under this alternative may adversely affect an estimated 20,000 acres of big game habitat over the short term. Although reclamation is on-going during the life of a mine, there should still be 19,740 acres of residual disturbed big game habitat. Surface mining of coal could adversely affect about 124 nests and about 10,030 acres of suitable raptor habitat.

Stipulations should reduce impacts to wildlife from geophysical activities during crucial seasons and periods. Restricting geophysical activities to existing roads and trails (although not technically feasible) would be the primary action providing the greatest benefit to wildlife habitat. Under conditions discussed within this alternative, no significant long-term impacts are anticipated. Short-term impacts would be reduced by at least 70 percent leaving about 155 miles of line displacing wildlife beyond normal road traffic.

Not allowing chemical treatment of vegetation would benefit amount and quality of available forage and cover for wildlife.

Summary

Wildlife and fisheries habitat would benefit the most under this alternative. Big game forage (quantity and quality) would generally improve. Water quality and fish habitat would improve as riparian areas improve and erosion decreases. The rate at which this occurs depends on the rate at which AMPs are written, or modified, to include riparian objectives, and management is fully implemented. This would probably occur gradually over the next 20 years.

Even under this alternative, habitat would be lost to other development activities as part of multiple use management. This loss, though, is significantly reduced from the other alternatives and overall there would be steady improvement which would offset those losses. Wildlife habitat and populations would be maintained or enhanced.

Displacement and loss of habitat from development and disruptive activities would create an unavoidable adverse impact (see Table 4-25). This affect would be less than under Alternative A. Wildfire could result in a long-term loss of habitat and would be considered an unavoidable adverse impact to the habitat.

Land disposals result in an irretrievable loss of wildlife habitat. However, this is offset somewhat through proposed acquisitions to enhance wildlife habitat. Generally, big game winter habitat is involved in the disposals and fisheries and riparian habitat is proposed to be acquired. Surface mining can result in an irreversible irretrievable loss of wetlands and springs, and although off-site mitigation occurs the original site is lost. Highway and major road development also result in irretrievable losses of habitat as they are generally permanent structures. Long-term impacts would continue to occur to wildlife habitat due to production activities and year round use in crucial areas. This impact would be reduced from Alternatives A and B.

Special Management Areas

Candidate Plants

These impacts would be the same as the Preferred Alternative. Wildfire and related suppression activities, areas where livestock concentrate (salting, watering), chemical control of noxious weeds, geophysical activity in potential habitat areas, off-road vehicle use, increased recreation use, trampling by wild horses, closure or expansion of the McKinnon dump, and conversions of sheep to cattle all contribute to an irreversible irretrievable loss of the plant populations. However, additional restrictions on geophysical activity, off-road vehicle use, and fire suppression activities, and a proposed 440-acre withdrawal would reduce the level of impact from Alternative A. Grandfathered mining claim activity and unauthorized uses could create an unavoidable adverse impact and could result in an irretrievable loss of plant populations.

Cedar Canyon ACEC

Alternative C offers the most effective protection of the cultural resource values in this ACEC.

Management activities in Cedar Canyon could have some long-term adverse impacts on ACEC values but impacts should be reduced from the Preferred Alternative and Alternatives A and B due to increased management prescriptions and restrictions. Visual intrusions that could destroy the integrity of the setting of the petroglyphs would be reduced by preventing such activities within ½ mile, and the proposed 515-acre withdrawal. Opportunity would be provided for Native American rituals. Displacement of big game from crucial winter range habitat would continue over the long term due to continued traffic and road use, construction, and production activities. Habitat availability could decline with further development activities. The 20-acre exclusion area for the major petroglyph site for rights-of-way would offer increased protection for this site.

To protect erosive soils, ORVs would be restricted to designated roads and trails and no over the snow vehicle would be allowed. Restricting off-road vehicle use during the spring and winter would protect wildlife values.

Coal could be leased, but no surface mining or facilities would be allowed to detract from the ACEC values.

Greater Sand Dunes ACEC

Management in the western portion would be the same as Preferred Alternative.

In the eastern portion, management prescriptions and restrictions would be designed to preserve and protect the geological, cultural, visual, and wildlife values associated with the Greater Sand Dunes ACEC. Implementation of the prescribed measures would reduce or minimize impacts associated with mineral development, lands actions, and off-road vehicle use. Residual impacts would be minor and would include:

Seasonal displacement of wildlife, predominantly elk and deer, as well as wild horses would occur through ORV activity. Seasonal displacement would be most prevalent during the summer and fall months.

Loss of vegetation on stable dunes would potentially occur through the development of oil and gas reserves and through facilities associated with oil and gas development. Potential oil and gas development in the 6,000 acres open to 3 wells per section could disturb up to 98 additional acres. Oil and gas development on the area open to one well per section (10,390 acres) could disturb an additional 57 acres.

Reductions in the visual integrity of the area would result from development of up to 40 new oil and gas wells.

Surface facilities (e.g. pipelines, snow fencing, etc.) would create safety hazards to ORV users.

Dune ponds and related riparian habitat would continue to be affected by livestock, wild horses, and wildlife use.

Benefits that would be realized through the management prescriptions and restrictions include:

Protection of sensitive cultural resource sites.

Protection of the Crookston Ranch.

Protection of the Native American religious and important geological values associated with the Boar's Tusk.

Acquisition of approximately 1,920 acres to consolidate public lands in the dune area would enhance wilderness, visual, and wildlife values.

The removal of abandoned facilities and the marking of known hazard areas would reduce some of the potential impacts to ORV users.

Retention of forage and native plant compositions for wildlife.

Retention of 10,390 acres as an "open" ORV area for recreational uses.

Monument Valley Area

Alternative C offers the most effective protection of cultural resource values in this area. No foreseeable adverse effects would occur, except those that could be mitigated under standard Section 106 compliance procedures. Benefits to cultural resources would result in the long term from the information provided from Class II inventory.

Some long-term impacts may occur to soils, slopes, and visual values due to activities on adjacent private lands requiring access across public lands. Silt production and sedimentation would occur. Unauthorized use could continue and result in an irretrievable loss of soil, cultural, and paleontological resources. Overall, impacts should be reduced from Alternative A because of the no surface occupancy requirement on erosive soils and slopes greater than 25 percent. Limiting off-road vehicle use to designated roads and trails would reduce impacts to watershed resources and erosive soils by limiting access and preventing further two-track trails.

A withdrawal of 43,600 acres would protect values from locatable mineral activity in the long term. Designation as an ACEC also provides additional protection from locatable mineral activity. Revocation of existing withdrawals would have no impact because of the new withdrawal.

Management of the area would provide for solitude and dispersed recreation but no additional facilities would be provided which could, in the long term, limit recreation opportunities. Management of wild horses would benefit area and recreational values.

Natural Corrals ACEC

The same Preferred Alternative benefits and impacts are projected for cultural resources, unauthorized use, and locatable mineral development activities.

The impact of Class IV visual management would be the same as for Alternative A.

Oregon Buttes ACEC

Impacts would be the same as those of the Preferred Alternative.

Pine Springs ACEC and Proposed Expansion

Impacts would be the same as those of Alternative A.

Red Desert Watershed Area

Management prescriptions in areas such as the proposed South Pass Historic Landmark and candidate species would provide benefits for resources in those portions of the area. Management prescriptions for the remainder of the area would allow some development activities which could cause localized adverse affects; however, these would not have a significant impact on the watershed. Off-road vehicle use would be limited to existing or designated roads and trails which would reduce erosion and visual degradation.

Standard application of Section 106 compliance procedures under multiple use management would adequately protect cultural resources in this area. There could be some as yet unidentified concerns of Native Americans in the area, but those cannot be analyzed at this time. Emphasis on visual resources would benefit cultural resources.

The area would be reduced in size to 341,000 acres. This would be mostly public lands, thus manageability would improve. Revocation of withdrawals could result in locatable mineral activity but the probability is slight. Restricting overhead powerlines would ensure long-term maintenance of present visual values.

Management under Alternative C would maximize opportunity for solitude and dispersed recreation. No significant adverse impacts would occur.

Approximately 10 wells would be drilled in the area, and both short- and long-term impacts would be minimal. Coal mining in relation to the Bridger mine would affect only a small portion of the watershed.

Development activities remove vegetation creating a short-term loss of the vegetation resource with some long-term loss of shrubs as restoration requires 20 years or longer. Impacts to vegetation affects available AUMs for livestock and horses and wildlife habitat. The amount affected would not be significant.

South Pass Historic Landscape

Designation of 87,580 acres as an ACEC and management as a historic landscape would draw appropriate attention to the historical significance of the area. Management prescriptions would generally benefit area values.

Withdrawal of 5,260 acres would ensure protection of the South Pass landmark area and no surface occupancy prescriptions on 46,180 acres and would preclude activities that could degrade visual and historic values in the viewshed. Designation as an ACEC requires a plan of development, and would place additional constraints on locatable mineral activity. Wildfire and related suppression activities could affect visual resource values and cause additional surface disturbance.

Additional closed acreage for off-road vehicle use and limiting all vehicles to designated roads and trails on another 46,180 acres would reduce short- and long-term impacts to cultural values. Unauthorized vehicle use would adversely affect landscape values.

Steamboat Mountain Area

A withdrawal on 43,000 acres would provide protection from locatable mineral activity. Designation as an ACEC requires a plan of development, and would place additional constraints on locatable mineral activity until withdrawals are in place. No mineral leasing and application of no surface occupancy prescriptions for the area would eliminate related impacts to area values in the long term. This alternative would provide the greatest benefit to the elk herd and elk habitat within the ACEC. Opportunities for development of mineral resources would be lost on 43,000 acres of high potential area.

Tri-State Monument Area

Management prescriptions for this area and designating a 293,228-acre area of the Red Creek ACEC, Currant Creek, and Sage Creek and Pine and Little Mountain areas as an ACEC would offer protection for watershed and fisheries resource values. Watershed and fisheries resources would receive the greatest benefit under this alternative.

Measures to control erosion would be generally beneficial to cultural resources by curtailing natural deterioration of numerous buried archaeological sites within these drainages.

There would be no impacts from coal mining activity, as discussed in Alternative A.

Withdrawing 131,780 acres within Currant Creek, Sage Creek, and Red Creek would prevent locatable mining exploration which could add to sediment loads. The mineral withdrawals to be revoked would remove some protection throughout the proposed ACEC; however, the new withdrawals would offset this impact. There would be no mineral leasing or subsequent development within Currant Creek which would reduce adverse impacts to the drainage.

The requirement for no surface occupancy, no mineral leasing, no material sales, and no sodium exploration on 73,860 acres within Currant Creek and Red Creek would ensure long-term reductions in sediment loading and enhancement of fisheries habitat. This would, however, mean a loss of revenue from mineral resource development.

The exclusion of rights-of-way in Currant Creek, Pine Mountain, and Little Mountain and the avoidance of rights-of-way throughout the area would reduce adverse impacts to the area but would require major reroutes of facilities around this proposed ACEC.

Short-term impacts would occur from vegetation manipulation but should result in long-term benefits. Currant Creek would benefit from the no surface occupancy and wildfire suppression restrictions. Sage Creek and the remaining area would benefit over the long term from the preparation of plans to mitigate impacts prior to disrupting and disturbing activities. ORV activity which is limited to designated roads and trails could, over the long term, adversely affect water quality, watershed values, and fisheries habitat.

Timber harvest throughout the proposed Tri-State Monument ACEC would be conducted taking into consideration watershed values. Such harvest designs would remove the decadent timber but still provide enough cover to provide for snow harvesting thereby maintaining the present local hydrologic cycle.

Wildfire and suppression activities could remove vegetation which would contribute to accelerated erosion. Additional management prescriptions would reduce overall short- and long-term impacts to ACEC values.

Red Creek Portion

The proposed actions for the Red Creek area provide for a number of activities which are expected to decrease erosion. These include physical erosion control structures, improvements in livestock and wildlife grazing management, and reclamation or improvement of road and trails. Since the object of the proposal is to reduce accelerated erosion, and therefore sediment and salinity into the Green River, it is expected that sediment would decrease in proportion to the number of proposed projects actually completed. Soil loss could be reduced from about 84,000 tons per year to 60,000 tons with total implementation.

Soil erosion rates should decrease in the long term with improved grazing management, road closures, and restrictions on development. Areas along drainages should develop more vegetative cover with 2 to 3 years rest. This would be especially significant to the regrowth of willows and cottonwoods in the riparian areas. Soil aggregate destruction and compaction should be reduced, thereby increasing soil infiltration rates and decreasing surface runoff. Closure and reclamation of up to 35 miles of roads and trails would reduce soil loss by about 5 to 10 tons/mile.

Since no major pipelines would be allowed to be located in the watershed, no new disturbance would be initiated.

A no leasing requirement on Red Creek would keep any new disturbance such as well pads, gravel pits, and associated roads from augmenting the present disturbance.

Only those roads necessary for management of the area would be kept open and the remainder obliterated and put to bed. This action would eliminate large amounts of sediment from getting into the Red Creek channel.

For the most part, any timber removal would be insignificant, since only a small acreage of the timber resource exists in the Red Creek watershed and what does exist is only found on the watershed boundary.

No grazing would allowed on 800 acres of riparian areas throughout the watershed for 3 years. This would allow for the re-establishment of mature willow stands in the Red Creek floodplain thereby reducing the bed load and suspended sediment emanating from the watershed.

Closing the right-of-way concentration route through Red Creek to further development would result in long-term benefits to the area and an overall reduction in produced sediment.

Accelerated human-caused erosion and sedimentation would noticeably be reduced which would have a beneficial effect on water quality.

Natural geologic erosion would continue for both the short and long term and would be considered an unavoidable adverse impact.

White Mountain Petroglyphs ACEC

This impacts of this alternative would be the same as the Preferred Alternative. This alternative would protect the petroglyphs and support Native American spiritual and religious concerns as well as the surrounding 500 acres. No development would be allowed unless it were for the benefit of the cultural resource. Long-term benefits would be realized by restricting any activity that could degrade the site. Benefits would also be provided to the public and especially the local communities through the educational opportunities provided by the area. Unauthorized uses could damage petroglyphs and impact area values.

Wild and Scenic Rivers

Impacts would be the same as described for the Preferred Alternative.

Alternative C Summary

This alternative would provide the greatest benefit to air quality, cultural and historical resources, visual values, watershed, water quality, vegetation, and wildlife habitat. By closing more areas to development and placing additional restrictions on that development, production would be less efficient and more expensive. Some production capability could be lost in the long term. Additional rights-of-way avoidance and exclusion areas would create more expense and reduce the areas and routes available for transportation facilities, providing a long-term adverse impact. Oil and gas development would be limited within the Red Desert Watershed area. This would maximize recreational user opportunity for solitude and dispersed recreation.

The values of Cedar Canyon, Greater Sand Dunes, and Natural Corrals ACECs would be retained and coal development would be constrained. Potential unacceptable impacts described under Alternative B would be alleviated and coal mining in Cooper Ridge and Elk Butte areas would not occur. This alternative would adversely affect coal development opportunities and production would decline in the long term. The extent of lost development opportunity was considered to be an unacceptable impact and another alternative was developed to provide consideration for further leasing while providing necessary protection to other resource values.

CHAPTER 5

CONSULTATION AND COORDINATION

INTRODUCTION

The Green River RMP EIS was prepared by an interdisciplinary team of specialists from the Green River Resource Area, the Rock Springs District Office, and the Wyoming State Office (Table 5-1). Reviews and accuracy and consistency were provided by both the district office and the state office staffs.

Consultation, coordination, and public involvement have occurred throughout the process through public meetings, informal meetings, individual contacts, news releases, and *Federal Register* notices.

Initial steps in the process began in 1988 with the development of a preparation plan. Other early efforts included research, inventory, analysis, and interagency coordination.

TABLE 5-1

GREEN RIVER RMP LIST OF PREPARERS

NAME	JOB TITLE	RMP RESPONSIBILITY
	Green River Office	
Bill LeBarron	Area Manager	Decision Maker
Pat Wendt	Assistant Area Manager	Decision Maker
Don Judice	Supervisory Petroleum Engineer	Assistant Team Leader, GIS Coordinator, Technical Coordinator
Rick Amidon	Wildlife Biologist	Wildlife and Water Maps; Raptors, Big Game
Teresa Deakins	Realty Specialist	Support
Jim Dunder	Wildlife Biologist	Wildlife
Sally Haverly	Realty Specialist	Lands, Access, Transportation
Jim Perkins	Supervisory Range Conservationist	Livestock, Wild Horses
Randy Porter	Geologist	Solid Minerals, Paleontology
Jim Sparks	Range Management Specialist/ Ecologist	Vegetation, Sensitive Plants
Russ Tanner	Archeologist	Cultural, Historic, Native American concerns
Andy Tenney	Outdoor Recreation Planner	Off-Road Vehicles, Recreation, Visual Resource Management
Dorothy Savage	Staff Assistant	Typing Support
Betty Nickerson	Area Clerk (Typing)	Support

TABLE 5-1 (Continued)

GREEN RIVER RMP LIST OF PREPARERS

NAME	JOB TITLE	RMP RESPONSIBILITY
Rock Springs District Office		
Renée Dana	Team Leader	Coordination, NEPA Responsibility
Mike Brown	Recreation Planner	Wild and Scenic Rivers
Chris Butler	Hydrologist	Watershed
John Henderson	Fisheries Biologist	Fish, Riparian Areas, Wetlands
John MacDonald	Soils Scientist	Soils
Bob Raper	Fire Management Officer	Fire Management
Dennis Stenger	ADM, Minerals	Solid Minerals
Dean P. Stilwell	Geologist	Geology, Fluid Minerals
Susan Smith	Cartographic Technician	Maps
Angelina Pryich	Writer/Editor	Editing
Lorrie Jaramillo	Staff Assistant	Typing Support
Diana Matozevich	Staff Assistant	Typing Support
Tracy Thompson	Staff Assistant	Typing Support
Rita Giorgis	Support Services Supervisor	Support
Kemmerer Office		
Roland Robbins	Forester	Forestry
Russ Storbo	Outdoor Recreation Planner	Off-Road Vehicles, Recreation, Wilderness, Visual Resource Management
Wyoming State Office		
Joe Patti	Natural Resource Specialist; Field Planning Coordinator	Planning process guidance; Technical review and training; Field/WSO Coordination
Carl Santmyer	Economist	Socioeconomics
Mike Sestak	Physical Scientist	Air Quality
Jerry Carter	Printing Management Specialist	Publication Coordination

TABLE 5-1 (Continued)

GREEN RIVER RMP LIST OF PREPARERS

NAME	JOB TITLE	RMP RESPONSIBILITY
Wyoming State Office (Continued)		
Sheri Morris	Printing Technician	Publications Preparation
Tamera Hammack	Printing Technician	Phototypesetting
Tina Roberts	Legal Clerk (OA)	Typing Support
Patrick Madigan	Supervisory Cartographer	Cartography, Illustrations, GIS Specialist
Roger Lawrence	Visual Information Specialist	Illustrations
Doug Morrow	Photolith	Photo Reproduction
Terri Mitchell	Supervisory Cartography Technician	Manual Cartography
Larry Neasloney	Cartography Technician	Cartography, GIS Assistance
Robert Lew	Cartography Technician	Manual Cartography
Marlene Walters	Cartography Technician	Digitizing
Esther Simons	Supervisory Cartography Technician	Manual Cartography, GIS Assistance
Mary Bonogofsky	Cartography Technician	Digitizing
Glenn Ellenson	Cartography Technician	Manual Cartography
Olen Johnson	Cartography Technician	Digitizing
Richard Puls	Cartography Technician	Digitizing
Nell Dieterle	Cartography Technician	Manual Cartography, Digitizing
Gretchen Meyer	Natural Resource Specialist	GIS Assistance, Digital Elevation Models

PUBLIC PARTICIPATION

A public participation plan was prepared to ensure that the public would have numerous opportunities to be actively involved in the planning and environmental process. Formal and informal input has been encouraged and used.

A letter was mailed in July 1989, requesting information on oil and gas resources. An "Issues Update" newsletter was mailed in October 1989 and November 1990. A letter was mailed in March 1990, requesting information on geologic favorability and potential for development. Open houses were held during November 1990 in Lander and Rock Springs, Wyoming. A questionnaire and issues were handed out and over 200 responses were received. A letter was mailed in February 1991 explaining wild and scenic river criteria.

The Rock Springs District Advisory Council has been kept apprised of the RMP progress, and their comments and recommendations have been solicited.

Each operator of a grazing allotment has been contacted either in person or in writing to discuss the categorization of their allotment.

BLM personnel have met formally or informally with many members of the ranching and mienrals industries and with other interest groups and agencies. A summary of comments.generated from these meetings is on file in the Green River Resource Area office.

Solid Minerals

On September 30, 1988, a notice was published in *Federal Register*, vol. 53, no. 190. This notice contained a request for any available information including coal information, and a call for expressions of interest for possible coal leasing. No specific expressions of interest were received as a result of this effort. On March 7, 1990, letters were sent to industry and other interested parties for information on mineral potential.

Thirty-nine letters of response were received from the scoping letters sent to industry, the public, and others for solid minerals resource data and development activities. Six maps showing sodium development, coal potential areas, gravel deposits, lands withdrawn from locatable mineral entry to protect oil shale values, Natural Corrals ACEC, and lands potentially closed to mineral entry for wilderness areas were enclosed with the scoping letter.

Three letters were received that had no comment for the preliminary assessment of geologic favorability for mineral occurrences but the parties wanted to remain on the contact list. Comments received are summarized by resource category.

Gravel Deposits

Twelve form letters were received opposing the sale of mineral materials (sand, gravel, etc.) in T. 21 N., Rs. 101 and 102 W. One letter indicated an interest in the aggregate in T. 21 N., Rs. 101 and 102 W. Opposition is centered around the detriment to the area's wildlife and general public use, and the close proximity to the Natural Corrals ACEC and its archeological and historical significance.

Paleontology

One responder was concerned about the lack of consideration for fossil resources in the planning process and that fossil protection should be considered a high priority.

Flaming Gorge National Recreation Lands

One responder noted that the lands withdrawn for locatable minerals did not show the Flaming Gorge National Recreation Area (NRA) as withdrawn. Also noted were that leasing or permits within the NRA could not be issued without the consent of the Department of Agriculture and that stipulations would be tiered to the Ashley National Forest Land and Resource Management Plan.

This responder also noted that the Bureau of Reclamation maintains a withdrawal from mineral entry lands for the Colorado River Storage Project near the Flaming Gorge NRA. Additional lands to be withdrawn are located in T. 12 N., R. 108 W.

Rivers

One writer noted that the Final Revised Guidelines for Eligibility, Classification, and Management of River Areas, removed the 25-mile length limitation for wild and scenic rivers. The writer recommended that the Sweetwater River (NRI-listed segment) and segments of other streams potentially eligible for wild and scenic river designation be evaluated as part of the RMP.

Project Lands

One letter was concerned about project lands (Bureau of Reclamation withdrawn lands) within the Green River Resource Area and identified how the Bureau of Reclamation planned to proceed with management of these lands.

Wildlife

Three letters identified concerns with wildlife. One letter had concerns with gravel deposits identified in T. 12 N., Rs. 112 and 113 W. that may occur within critical elk winter range.

One letter was concerned about the amount of mineral activity as a single use endeavor and little regard for wilderness, soil, water, and air resources.

One letter stressed that wildlife and associated recreation should be a major goal in developing the Green River RMP. Of particular concern is an area south of I-80 between Highway 430 and the Flaming Gorge Reservoir that reportedly supports a wide diversity of wildlife. This letter expressed support for all locatable mineral withdrawals including the oil shale locatable mineral withdrawal, support for all game habitat including stringent stipulations, and special fishery value concerns such as no mineral development within 1,000 feet of the above streams and rivers from Fontenelle Reservoir to and including the entire shoreline of the Flaming Gorge Reservoir within the NRA and Currant and Red creeks.

Oil and Gas

Three letters expressed concerns as to the impact on oil and gas development in the resource area.

Wilderness

Six letters received were concerned about minerals and wilderness designations. Two of the letters expressed concern that the most southwestern WSA could create problems for future sodium development in the southern end of the KSLA. Two of the letters thought the WSAs lacked the true characteristics to meet wilderness designation and administrative costs would be too high. One of the letters objected to the wilderness area near Farson as it has potential for sodium brines and possibly coal. Three of the letters expressed concern over the wilderness areas being for a few and segregated from mineral entry.

ACEC

Four letters supported the present Natural Corrals ACEC and the withdrawal from locatable mineral entry, but two letters made note of mineral interest within the area.

Coal

Four letters agreed with the coal potential area as outlined.

Minerals General

Twelve letters were received concerning the continuation of mineral development. Concerns were expressed over the oil shale withdrawal excluding other mineral development. One letter did support the withdrawal to protect the oil shale resource from being separated by mining claims. Some concerns were expressed that demand for additional minerals from southwest Wyoming could be restricted from development with improper management and new withdrawals.

Two letters expressed concerns for development of other minerals in the resource area.

CONSISTENCY

Coordination with other agencies and consistency with other plans was accomplished through frequent communications and cooperative efforts between the BLM and involved federal, state, and local agencies and organizations (Table 5-2).

The Wyoming Governor's Clearinghouse receives 20 copies of this draft document for review to ensure consistency with ongoing State plans. The RMP team reviews county land use plans for Sweetwater County to ensure consistency. Meetings are held with the respective county planners and commissioners to promote greater understanding of goals, objectives, and resources of both the counties and the BLM.

TABLE 5-2

KEY COORDINATION ACTIONS

AGENCY	COORDINATION/RESPONSIBILITY
FEDERAL AGENCY	
U.S. Department of the Interior	
Bureau of Mines	Approval for recovery of federally owned helium from natural gas.
Bureau of Reclamation	Coordinate mineral leasing and other activities that affect lands that are administered by the BOR. Review the RMP for consistency with BOR planning.

TABLE 5-2

KEY COORDINATION ACTIONS

AGENCY	COORDINATION/RESPONSIBILITY
FEDERAL AGENCY	
U.S. Department of the Interior (Continued)	
Fish and Wildlife Service	Review actions affecting threatened or endangered species of fish, wildlife, or plants.
Geological Survey	Review of RMP for consistency with USGS planning.
Minerals Management Service	Review of RMP for consistency with MMS planning.
U.S. Department of Agriculture	
Forest Service	Coordinate mineral leasing and other activities that affect lands administered by USFS. Review the RMP for consistency with USFS planning.
	Review of RMP for consistency with the management actions. The proposed actions would also be discussed with the Wyoming State Forestry Division and other agencies involved in wild land fire management.
COUNTY AGENCIES	
Fremont, Lincoln, Sublette, Sweetwater, Uinta	Review RMP for consistency. Zoning. Access permits.

CONSULTATION AND COORDINATION

Members of the RMP team have consulted formally or informally with numerous agencies, groups, and individuals in the RMP development process. The following list is representative of the businesses, agencies, organizations, and individuals who have indicated an interest in the Green River RMP and who have been contacted during the planning process. This list is not all-inclusive. A complete list is on file in the Rock Springs BLM District Office and the Green River Resource Area Office.

Meetings were held with RMOGA, Sierra Club, Friends of Wild Wyoming Deserts, and Sweetwater County representatives.

Unsuitability Criteria

Comments received from the U.S. Fish and Wildlife Service and the Wyoming Game and Fish Department as required under the consultation process of the coal unsuitability criteria (43 CFR 3461) are summarized as follows:

> Comments concerning Criteria 9 and 10 for Federally Listed Endangered Species Habitat and State Listed Endangered Species stated that no critical or essential habitat has been determined but habitat of essential value is located in the resource area. Habitat for specific species were indicated.
>
> Comments concerning Criteria 11 and 12 for Bald and Golden Eagle Nest Sites and Roosts stated that an active bald eagle nest is locate within the Seedskadee National Refuge and that the area from Fontenelle to the City of Green River would be considered important habitat.
>
> The Game and Fish Department stated that under Criterion 15, Habitat for State High-Interest Wildlife and Plants, maps have

been furnished to BLM of crucial habitat and priority species; many of the lands should be considered unsuitable or subject to replacement-in-kind; and that the Game and Fish Department would like Criterion 15 to reflect determination of these lands as a "joint" decision (by BLM and WGFD), not after consultation the surface management agency will make the determination.

The U.S. Fish and Wildlife Service stated that under Criterion 19, National Resource Water, concern should be given to water quality with respect to effects on fisheries, migratory birds, and federally listed threatened or endangered species.

Federal Agencies

Department of the Interior

Bureau of Indian Affairs
Bureau of Land Management
Bureau of Mines
Bureau of Reclamation
Fish and Wildlife Service
Geological Survey
National Park Service
Minerals Management Service
Office of Environmental Affairs

Department of Agriculture

Forest Service
Soil Conservation Service

Department of Commerce

Department of Defense

Department of Energy

Department of Housing and Urban Development

Department of Transportation

Environmental Protection Agency

State of Wyoming

Department of Environmental Quality
Game and Fish Department
Geological Survey of Wyoming
Governor of Wyoming
State Clearinghouse
State Engineer
State Highway Department
State Historic Preservation Office
Wyoming Recreation Commission
University of Wyoming

Federal Elected Officials

Congressman Craig Thomas
Senator Alan Simpson
Senator Malcolm Wallop

State Elected Officials

Senators and Representatives of Fremont, Lincoln, Sublette, Sweetwater, and Uinta counties.

Local Governments

County governments of Fremont, Lincoln, Sublette, Sweetwater, and Uinta counties.

Mayors' offices of Granger, Green River, Rock Springs, and Superior.

Tribal Councils

Arapaho and Shoshoni Tribal Councils

Industry

Arco Coal Co.
Black Butte Coal Co.
Bridger Coal Company
Chevron USA, Inc.
Christmann and Associates
Church and Dwight Co., Inc.
Cumberland Coal Company
Exxon Company U.S.A.
FMC Wyoming Corporation
General Chemical Co.
Homestake Mining Company
Marathon Oil Co.
Minerals Exploration Corp.
Mobil Oil Corporation
Mountain Bell
Mountain Fuel Supply Co.
Nerco Inc.
Northwest Pipeline Corporation
Pacific Power
Pacificorp
Petroleum Association of Wyoming
Questar Corporation
Questar Pipeline Co.
Rhone-Poulenc of Wyoming Co.
Rocky Mountain Energy
Rocky Mountain Oil and Gas Association (RMOGA)
Texaco Inc.
Texas Gulf, Inc.
Union Pacific Railroad
Union Pacific Resources Co.
Utah Power and Light Company

Associations and Interest Groups

American Humane Association
Animal Protection Institute of America
Citizens for Survival of the Red Desert
Defenders of Wildlife
Environmental Defense Fund
Friends of Wild Wyoming Deserts
Greater Yellowstone Coalition
Independent Petroleum Association of Mountain States
Izaak Walton League
National Audobon Society
National Wildlife Federation
Natural Resources Defense Council
Northern Plains Resource Council
Oregon-California Trails Association
Public Land Foundation

Associations and Interest Groups (Continued)

Rock Springs Grazing Association
Seedskadee Audobon Society
Sierra Club
Society for Range Management
Southwest Wyoming Industrial Association
Sweetwater Economic Development Association (SWEDA)
The Nature Conservancy
WHOA
Wild Horses Yes
Wilderness Society
Wyoming Wildlife Federation

Others

Many individuals were contacted, including all range permittees and lessees in the Green River Resource Area.

GLOSSARY

ACTIVE DUNE. A hill or accumulation of sand shaped by wind. A dune is active when constantly changing form under wind currents. Generally, an active dune is bare of vegetation.

ACTIVITY FUELS. Fuels resulting from, or altered by, forestry practices such as timber harvest or thinning, as opposed to naturally created fuels.

AIR POLLUTION. The general term alluding to the undesirable addition of substances (gases, liquids, or solid particles) to the atmosphere that are foreign to the natural atmosphere or are present in quantities exceeding natural concentrations.

AIR QUALITY CONTROL REGION. A primary air quality administrative area, designated in accordance with the provisions of the 1970 Clean Air Act, on the basis of geographical and meteorological considerations.

ALKALINE-SALINE SOIL. Soil with a pH greater than 7.0 throughout most or all of it occupied by plant roots; and enough soluble salts to impair plant productivity.

ALKALINE SOILS. Any soil that has a pH value of greater than 7.0. However, common usage when referring to problem soils (i.e., for revegetation) is usually for soils with a pH of 8.5 or higher, often accompanied by an exchangeable sodium content of 15 percent or higher.

ALLOWABLE BURNED AREA. Maximum average area burned over a specified period of year that is considered an acceptable loss for a specified area under organized fire suppression.

ALLOWABLE CUT. The amount of timber considered available for cutting during a specified period (year, decade, etc.).

ALLUVIUM. Unconsolidated fragments from rocks or minerals, moved from their place of origin and deposited by running water; including gravel, sand, silt, clay, and mixtures of these materials.

ANIMAL UNIT MONTH (AUM). The amount of forage to sustain one mature cow or the equivalent, based on an average daily forage consumption of 26 pounds of dry matter per day. The equivalent animal units for other ungulate species, based on a weight conversion (3 percent body weight per day), are: 10.5 for antelope; 7.6, deer; 2.1, elk; 1.2, moose; 0.9, wild horses; and 5.2, sheep.

ANTICLINAL. Inclined toward each other; an anticline is a unit of folded strata that is convex upward. In simple anticlines the beds are oppositely inclined. In more complex types the limbs of strata may dip in the same direction.

APPROPRIATE MANAGEMENT LEVEL (AML). The optimum number of wild horses that provides a thriving natural ecological balance on the public range.

AVAILABLE FUEL. That portion of the total fuel that would actually be consumed under specified burning conditions. Unless otherwise stated, this term is assumed to be just the fuel consumed in the fire front and is used in this context in the models incorporated in NFDRS and BEHAVE. Although generally ignored, the fuel consumed behind the fire front by intermittent flaming and glowing combustion is also a part of available fuel and can in some instances comprise a significant portion of the total.

AVERAGE WORST YEAR. Third worst fire season in the last ten, as determined by the sum of daily danger or burning indices during the regularly financed fire season; use the same number of days each year to determine these totals.

AVOIDANCE AREA. Areas on public lands where future rights-of-way may be granted only when no feasible alternative route or designated right-of-way corridor is available.

BACKFIRE. (1) as used in fire suppression activities, see SUPPRESSION FIRING. (2) as used in prescribed burning activities (to designate the fire movement in relation to wind or slope), see BACKING FIRE.

BADLAND. Surface features characterized by sharp erosional scar sculpture of weak rocks, forming steep, furrowed, and fantastically shaped hills, labyrinth-like drainage patterns, and normally dry watercourses.

BASE AREA (NFDRS). An area representative of the major fire problems on a protection unit. Base fuel model and slope class are chosen from the base area.

BASE FUEL MODEL (NFDRS). A representation of the vegetative cover and fuel in a base area; used in the calculation of fire danger rating.

BIODIVERSITY. Refers to the variety of life and its processes and includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

BOARD FOOT. A measurement of the volume of a tree which is based on a block of wood one foot on each side and one inch thick.

BOARD OF REVIEW. A board or committee selected to review results of fire suppression action on a specific unit or the specific action taken on a specific fire in order to identify reasons for both good and poor action and to recommend or prescribe ways and means of doing a more effective and efficient job.

BROADCAST BURNING. Allowing a prescribed fire to burn over a designated area within well-defined boundaries to achieve some land management objectives.

BRUSH FIRE. A fire burning in vegetation characterized by shrubs or small trees (cf. forest fire, range fire, wildfire).

BRUSH MANAGEMENT. Manipulation of stands of brush by manual, mechanical, chemical, or biological means or by prescribed burning for the purpose of achieving land management objectives.

BURNING INDEX (BI). A relative number related to the contribution that fire behavior makes to the amount of effort needed to contain a fire in a specified fuel type. Doubling the BI indicates twice the effort will be required to contain a fire in that fuel type as was previously required providing all other parameters are held constant.

BURNING PERIOD. That part of each 24-hour period when fires spread most rapidly, typically from 1,000 hours to sundown.

CAMPING. Overnight occupancy on public land.

GLOSSARY

CANDIDATE PLANT SPECIES CATEGORIES (definition of).

Category 1. Plants for which the USFWS currently has on file substantial information on biological vulnerability and threat(s) to support the appropriateness of proposing to list them as endangered or threatened species. Presently, all data are being gathered concerning precise habitat needs and, for some of the plants, concerning the precise boundaries for critical habitat designations. Development and publication of proposed rules on these plants are anticipated, but because of the large number of such plants, could take some years.

Category 2. Plants for which information now in possession of the USFWS indicates that proposing to list them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate preparation of rules. Further biological research and field study usually will be necessary to ascertain the status of the plants in Category 2, and some of the plants are of uncertain taxonomic validity. It is likely that some of these will not warrant listing, while others will be found to be in greater danger of extinction than some plants in Category 1.

Category 3. Plants that have proven to be more abundant or widespread than was previously believed and/or those that are not subject to any identifiable threat. Should further research or changes in land use indicate significant decline in any of these plants, they may be reevaluated for possible inclusion in Category 1 or 2.

CANDIDATE SPECIES. A plant or animal species whose numbers are declining so rapidly that official listing as threatened or endangered pursuant to Section 4 of the Endangered Species Act may become necessary as a conservation measure. Declines may be due to one or more factors, including: destruction, modification, or curtailment of the species' habitat or range; overutilization for commercial, sporting, scientific, or educational purposes; disease or predation; the inadequacy of existing regulatory mechanisms; or other factors.

CAUSES OF FIRES. For statistical purposes, fires are grouped into broad fire cause classes: lightning, campfire, smoking, debris burning, incendiary, equipment use, railroad, children, and miscellaneous.

CHAIN. Unit of measure in land survey, equal to 66 feet (80 chains equal 1 mile). Commonly used to report fire perimeters and other fireline distances, this unit is popular in fire management because of its convenience in calculating acreage (e.g., 10 square chains equal one acre).

CHECKERBOARD LAND PATTERN. Alternating sections of federally owned lands with private or State lands on either side of the Union Pacific railroad in southwestern Wyoming. This pattern of land ownership looks like a checkerboard on maps using different colors o show land status.

CHERRYSTEMMED. A WSA boundary which is drawn around a dead-end road or other linear feature to exclude it from the WSA.

CLINOPTILOLITE. A zeolite mineral occurring in the Bridger Formation; a hydrous alumino-silicate formed by the alteration of volcanic tufts and glasses. Zeolites are used as absorbents in drying, in air separation, in water treatment, in the paper industry, as a dietary supplement for livestock, and as a soil conditioner.

CONSUMPTIVE USE. Recreation activities which consume natural resources. Hunting and fishing are regarded as consumptive recreation because wildlife are consumed. Rockhounding is consumptive because nonrenewable resources are removed.

CONTAIN A FIRE. Take fire suppression action as needed which can reasonably be expected to keep the fire within established boundaries under prevailing conditions.

CONTAINMENT. Completion of a control line around a fire and any associated spot fires which can reasonably be expected to stop the fire's spread.

CONTROL A FIRE. Complete a control line around a fire, any spot fire therefrom, and any interior island to be saved, burn out any unburned area adjacent to the fire side of the control lines, and cool down all hot spots that are immediate threats to the control line, so that the line can be expected to hold under foreseeable conditions. Implies more thorough suppression than containing a fire.

CONTROL LINE. Comprehensive term for all constructed or natural barriers and treated fire edges used to control a fire.

CONTROL TIME. Elapsed time from the first work on a fire until holding the control line is assured (sometimes still measured only from the time of containing a fire).

CRUCIAL WINTER RANGE. That portion of a winter range to which a wildlife species is confined during periods of heaviest snow cover. This area is the determining factor in a population's ability to maintain and reproduce itself at a certain level (at or above the WGFD population objective) over the long term. This area will usually be occupied 8 out of 10 years.

CULTURAL RESOURCE INVENTORY LEVELS. A three-tiered process for discovering, recording, and evaluating cultural resources.

Class I - a review of existing literature and oral informant data together with an analysis of a specific geographic region (eg. an area of potential effect, drainage basin, resource area, etc.).

Class II - A sampling survey usually aimed at developing and testing a predictive model of cultural resource distribution.

Class III - an on-the-ground survey to discover, record, and evaluate cultural resources within a specific geographic area (eg. usually an area of potential effect for a proposed undertakings).

CULTURAL RESOURCE MANAGEMENT PLAN. A site specific activity plan regarding management of cultural resources, or a plan for managing a particular class of cultural resource.

GLOSSARY

DAILY ACTIVITY LEVEL (NFDRS). In fire danger rating, a subjective estimate of the degree of activity of a potential human-caused fire source relative to that which is normally experienced. Five activity levels are defined: none, low, normal, high, and extreme.

DEAD FUELS. Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.

DESIRED PLANT COMMUNITY. The plant community which provides the vegetation attributes required for meeting or exceeding RMP vegetation objectives. The desired plant community must be within an ecological site's capability to produce these attributes through natural succession, management action, or both (BLM Wyoming Instruction Memorandum 91-290, 5/29/91).

DISRUPTING ACTIVITIES. Disruptive pertains primarily to human presence and related activities that may cause displacement of or excessive stress to wildlife during critical life-cycle periods.

DISTURBANCE FACTOR FOR WILDLIFE. Defined as human activities, including traffic and motorized activities often associated with surface disturbance activities that affect wildlife species, particularly in crucial ranges.

DROUGHT. A period of relatively long duration with substantially below-normal precipitation, usually occurring over a large area.

ENERGY RELEASE COMPONENT (ERC). The computed total hear released per unit area (BTU's per square foot) within the fire front at the head of a moving fire.

EOLIAN ICE-CELLS. Perennial ice formed from snowfall and insulated from summer heat by a cover of windblown sands. This ice feeds small ponds within the dunes.

ERODIBILITY. The tendency of a soil to erode as influenced by texture under specified salts, structure, or slope.

EXCLUSION AREA. Areas where future rights-of-way may be granted only when mandated by law.

EXTENSIVE RECREATION MANAGEMENT AREAS. BLM administrative units where recreation management is only one of several management objectives and where limited commitment of resources is required to provide extensive and unstructured type of recreation activities. They may contain recreation sites. These areas consist of the remainder of land areas not included in Special Recreation Management Areas within a resource area.

EXTIRPATION. Extermination.

FINE FUELS. Fast-drying dead fuels, generally characterized by a comparatively high surface are-to-volume ratio, which are less than 1/4 inch in diameter and have a timelag of one hour or less. These fuels (grass, leaves, needles, etc.) ignite readily and are consumed rapidly by fire when dry.

FIRE BENEFITS. Fire effects with positive monetary, social, or emotional value or that contribute, through changes in the resource base, to the attainment of organizational goals.

FIRE CLIMAX. Plant community maintained by periodic fires.

FIRE DAMAGE. Detrimental fire effects expressed in monetary or other units, including the unfavorable effects of fire-induced changes in the resource base on the attainment of organizational goals.

FIRE DANGER. Sum of constant danger and variable danger factors affecting the inception, spread, and resistance to control, and subsequent fire damage; often expressed as an index.

FIRE DANGER RATING. Fire management system that integrates the effects of selected fire danger factors into one or more qualitative or numerical indices of current fire protection needs.

FIRE EFFECTS. Physical, biological, and ecological impacts of fire on the environment.

FIRE ENVIRONMENT. Surrounding conditions, influences, and modifying forces of topography, fuel, and air mass that control fire behavior.

FIRE FUEL MODELS. Four National Fire Danger Rating System fuel models (G, H, L, and T, respectively) (Deeming 1978) adequately describe the make-up and potential fire danger of the fuels involved in the planning area.

Fuel Model T fuels are characterized by the sagebrush-grass types of the Great Basin and the Intermountain West. The shrubs burn easily and are not dense enough to shade out grass and other herbaceous plants. The shrubs occupy at least one-third of the site or the A or L fuel models should be used. Fuel Model T might be used for immature scrub oak and desert shrub associations in the west, and the scrub oak-wire grass type in the southeast. This fuel model is found on 4,880,747 acres of the planning area.

Fuel Model L is meant to represent western grasslands vegetated by perennial grasses. The principal species are coarser and the loadings heavier than those in Model A fuels. Otherwise the situations are very similar; shrubs and trees occupy less than one-third of the area. The quantity of fuel in these areas is more stable from year to year. This fuel model may be substituted for Fuel Model J in the early summer and late fall due to the availability of fine fuels.

Fuel Model H is represented by the short-needled conifers (white pines, spruces, larches, and firs). In contrast to Model G fuels, Fuel Model H describes a healthy stand with sparse undergrowth and a thin layer of ground fuels. Fires in H fuels are typically slow spreading and dangerous only in scattered areas where the downed woody material is concentrated. This fuel model is found on 116,816 acres on the planning area. Juniper may also be represented in extreme fire danger situations.

FIRE FUEL MODELS *(Continued).*

Fuel Model G is used for dense conifer stands where there is a heavy accumulation of litter and downed woody material. Such stands are typically overmature and may also be suffering insect, disease, wind, or ice damage; natural events that create a very heavy buildup of dead material on the forest floor. The duff and litter are deep and much of the woody material is more than three inches in diameter. The undergrowth is variable, but shrubs are usually restricted to openings. Types meant to be represented by Fuel Model G are hemlock-sitka spruce, coast Douglas-fir, and windthrown or bug-killed stands of lodgepole pine and spruce. This fuel model is located in small isolated areas generally associated with wet, low fire danger areas. Only during drought conditions do these areas pose a threat.

FIRE LOAD. Number and size of fires historically experienced on a specified unit over a specified period (usually one day) at a specified index of fire danger.

FIRE MANAGEMENT OBJECTIVE. Planned, measurable result desired from fire protection and use based on land management goals and objectives.

FIRE MANAGEMENT PLAN. Statement, for a specific area, of fire policy, objective, and prescribed action; may include maps, charts, tables, and statistical data.

FIRE PLANNING. Systematic technological and administrative management process of designing organization, facilities, and procedure to protect wildland from fire.

FIRE SEASON. Period(s) of the year during which fires are likely to occur, spread, and damage wildlife values sufficient to warrant organized fire suppression.

FIRE SUPPRESSION. All work and activities associated with fire-extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

FIRE WEATHER. Weather conditions which influence fire ignition, behavior, and suppression.

FLUVIATILE. Produced by river action; belonging to a river.

FOREST FIRE. Variously defined for legal purposes (e.g., the State of California Public Resources Code: an uncontrolled fire on lands covered wholly or in part by timber, brush, grass, grain, or other flammable vegetation). Types of fires are ground, surface and crown (cf. brush fire, grass fire, range fire, wildfire).

FOREST RESOURCE MANAGEMENT CATEGORIES.

1. *Lands available for intensive management of forest products.* Areas where forest management is the primary use and where other resource uses or values occur but are not emphasized.

2. *Lands available for restricted management of forest products.* Areas where multiple use or other resource values are emphasized but timber harvest occur.

3. *Lands where the forest management is for the enhancement of other uses.* Areas where forest management activities are specifically for the benefit of other identified resource uses or values.

4. *Forest lands not available for management of forest products.* Areas where no forest management is planned.

FUEL LOADING. Ovendry weight of fuel per unit area (usually expressed in tons/acre). Loading may be referenced by fuel size or timelag categories.

FUEL MODEL. Act or practice of controlling flammability and reducing resistance to control of wildland fuels through mechanical, chemical, biological, or manual means, or by fire, in support of land management objectives.

FUEL TREATMENT. Any manipulation or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control (e.g., lopping, chipping, crushing, piling, and burning).

GREEN RIVER AIRSHED. Defined as the air over the Green River Basin. Its contents are moved by prevailing winds. Some particulates in this airshed have been documented to be from as far away as the Mexican border.

GUZZLER. A water development for wildlife.

HAZARDOUS MATERIAL. A material or substance which has been determined to be capable of posing an unreasonable risk to health, safety, and the environment. Refer to 40 CFR 261.

HAZARDOUS WASTE. The residues of hazardous materials which, when improperly disposed of, become a risk to people and the environment. Refer to 40 CFR 261.

HIGH VALUE WILDLIFE HABITATS. Those areas which support greater biodiversity, unique or special status plant or animal species, or greater abundance of a species. Examples of these habitats are: riparian or wetland areas, heavily occupied canyons or cliffs, or crucial big game winter or parturition areas.

HUMAN-CAUSED FIRE. Any fire caused directly or indirectly by person(s).

HUMAN-PRESENCE DISTURBANCE (OR DISRUPTIVE) ACTIVITIES. Used in the context of the physical presence, sounds, and movements of humans and their activities (on, below, or above the land surface), whether on foot, or beast of burden, or using mechanized or motorized vehicles or equipment.

HUNTER-DAY. The presence of one person in an area for the purpose of engaging in a hunting activity during all or part of a calendar day.

HYDRIC SOIL. A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part.

HYDROPHOPIC SOILS. Water-repellant soils.

HYDROPHYTE. Any plant that grows in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content; plants typically found in wetlands and other aquatic habitats.

HYDROPHYTIC VEGETATION. Plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content.

INCENDIARY FIRE. Wildlife willfully ignited by anyone to burn, or spread to, vegetation or property not owned or controlled by that person and without consent of the owner or his/her agent.

INTERMITTENT STREAM. A stream or part of a stream that flows only in direct response to precipitation. It receives little or no water from springs and is dry for most of the year.

KEETCH-BYRAM DROUGHT INDEX. Commonly-used drought index developed specifically for fire management applications, with a numerical range from 0 (no moisture deficiency) to 800 (maximum drought).

LACUSTRINE. Produced by or formed in a lake or lakes.

LEASABLE MINERALS. Minerals subject to lease by the Federal Government; include oil and gas, coal, phosphate, sodium, potash, and oil shale, as well as geothermal resources.

LIFE OF MINE. Time period it takes to exhaust the recoverable coal reserves within a mine or permit area.

LIGHTNING FIRE. Wildfire caused directly or indirectly by lightning.

LITHIC SCATTER SITE. A class of cultural resource that consists of an array of chipped stone artifacts without other kinds of artifacts or features.

LOCATABLE MINERALS. Minerals subject to disposal and development through the Mining Law of 1872 (as amended). Generally includes metallic minerals such as gold and silver and other materials not subject to lease or sale.

MODERATE STANDS. Timber stands five to 100 acres in size.

MULTIPLE USE. In Section 103 of FLPMA, "... management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific, and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with relative consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest return or the greatest unit output."

NATIONAL REGISTER OF HISTORIC PLACES. A list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture.

NATURAL FIRE. Any fire of natural origin (e.g., lightning, spontaneous combustion, volcanic activity) which is allowed to burn because it is accomplishing one or more resource management objectives.

NATURAL FUELS. Fuels resulting from natural processes and not directly generated or altered by land management practices.

NATURAL GEOLOGIC EROSION. The wearing away of the land (soil) surface by running water, waves, moving ice and wind, or by such processes as mass wasting and corrosion (solution and other chemical processes) versus induced erosion.

NATURALNESS. In Section 2(c) of the Wilderness Act, the wilderness characteristic in which an area "generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable."

NECESSARY TASKS. Work requiring the use of a motor vehicle. Examples include picking up big game kills, repairing range improvements, managing livestock, mineral activities where surface disturbance does not total more than 5 acres as described in the "5-acre exemption" under the 43 CFR 3809 regulations, etc.

NONCONSUMPTIVE RECREATION. Wildlife-associated recreation which is not fishing, hunting, or trapping. Nonharvesting activities, such as feeding, photographing, and observing fish and other wildlife, picnicking, camping, etc., are nonconsumptive wildlife activities.

NONIMPAIRMENT CRITERIA. The criteria by which temporary impacts in a WSA can be rehabilitated to be substantially unnoticeable; the damaged environmental systems are capable of being rehabilitated to essentially the condition which existed on the date the activity was approved by BLM; and rehabilitation can be accomplished practically by the time of Congressional designation of the area as wilderness or, in the case of new mineral activities, within five years of designation.

NO SURFACE OCCUPANCY (NSO). No surface disturbing activities or surface disturbance, of any nature or for any purpose, will be allowed in the area of concern.

OFF-ROAD VEHICLE MANAGEMENT DESIGNATIONS.

Open: Vehicle travel is permitted in the area (both on and off roads) if the vehicle is operated responsibly in a manner not causing, or unlikely to cause significant, undue damage to or disturbance of the soil, wildlife, wildlife habitat, improvements, cultural, or vegetative resources of other authorized uses of the public lands.

Limited: 1) A limited designation means vehicle travel is permitted only on roads and vehicle routes which were in existence prior to the date of designation in the Federal Register. Vehicle travel off existing vehicle routes is permitted only to accomplish necessary tasks and only if such travel does not result in resource damage. Or, 2) Vehicle travel is limited by number or type of vehicle and (or) season of use.

OFF-ROAD VEHICLE MANAGEMENT DESIGNATIONS (Continued).

Closed: A closed designation means that vehicle travel is prohibited in the area. Access by means other than motorized vehicle is permitted.

OVERMATURE. A description of a timber type (or stand) that is past the age of maturity as defined by the culmination of mean annual increment and exhibit characteristics of decadence which may include (but are not limited to) low growth rates, dead and dying trees, snags, and an accumulation of down woody materials.

PERENNIAL STREAM. A stream or reach of a stream which flows continuously throughout the year, and whose upper surface generally stands lower than the water table in the region adjoining the stream. A permanent or live stream.

PLAYA. The usually dry, nearly level, lake plain that occupies the lowest parts of closed depressions, such as those on intermontane basin floors. Temporary flooding occurs in response to precipitation runoff, forming broad, shallow sheets of water which quickly gather and almost as quickly evaporate.

POLETIMBER. A class of live trees that measure 5.0 to 8.9 inches diameter breast height (dbh).

PRECIPITATION. Any or all forms of water particles, liquid or solid, that fall from the atmosphere and reach the ground.

PRESCRIBED BURNING. Controlled application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions which allow the fire to be confined to a predetermined area and at the same time to produce the fireline intensity and rate of spread required to attain planned resource management objectives.

PRESCRIBED FIRE. A fire burning within prescription, resulting from planned or unplanned ignition.

PRESCRIPTION. Written statement defining objectives to be attained as well as temperature, humidity, wind direction and wind speed, fuel moisture content, and soil moisture under which the fire will be allowed to burn, generally expressed as acceptable ranges of the various indices, and the limit of the geographic area to be covered.

PROPER FUNCTIONING CONDITION. The functioning condition of riparian-wetland areas is a result of interaction among geology, soil, water, and vegetation. Riparian-wetland reas are functioning properly when adequate vegetation is present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; filter sediment and aid floodplain development; improve floodwater retention and groundwater recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl, breeding, and other uses; and support greater biodiversity.

PUBLIC LAND. Land administered by the Bureau of Land Management.

RAPTOR. A bird of prey, such as an eagle, hawk, or owl.

RARE SPECIES. Wildlife species whose populations are consistently small and widely dispersed, or whose ranges are restricted to a few localities, such that any appreciable reduction in numbers, habitat availability, or habitat condition might lead toward extinction.

RECLAMATION. The reconstruction of disturbed ecosystems by returning the land to a condition approximate or equal to that which existed prior to disturbance, or to a stable and productive condition compatible with the land use plan. The immediate goal of reclamation is to stabilize disturbed areas and protect both disturbed and adjacent undisturbed areas from unnecessary degradation.

RECREATION USER DAY. Any recreational activity taking place within a 24-hour period, or portion thereof, for each individual recreating on public lands.

RESOURCE DAMAGE. Defined as leaving long-term signs of seismic/vehicle use (ruts) or causing erosion or water pollution.

RESTRICTED AREAS. Areas where mitigation such as seasonal restrictions is required to protect resource values.

RIPARIAN. Situated on or pertaining to the bank of a river, stream, or other body of water. Normally used to refer to the plants of all types that grow rooted in the water table or streams, ponds, springs, etc.

RIPARIAN HABITAT. A highly valued wetland vegetation community found along or around streams, lakes, ponds, and other open water (both perennial and intermittent). This unique habitat is crucial to the continued existence of many fish and wildlife species known to occur in the area. Riparian vegetation helps maintain high water tables, stabilize pond and streambanks, create quality fish and wildlife habitat, prevent or reduce flooding, and maintain or improve water quality.

SALINITY. The concentration of dissolved salts in water. It is used to indicate the existence of saline soils. The electrical conductivity (EC) of a saturated extract is the standard measure of salinity and is expressed as mmhos/om. Classes of salinity and their electrical conductivity level: nonsaline - less than 2; very slightly saline - 2-4; slightly saline - 4-8; moderately saline - 8-16; strongly saline - greater than 16.

SAPLING. A tree that is greater than three feet in height and less than four inches in diameter.

SAWTIMBER. A class of live trees that measure 9 inches diameter breast height (dbh) and larger.

SECTION 106 CONSULTATION. Also known as the 36 CFR 800 process. Discussions between a federal agency official and the Advisory Council on Historic Preservation, State Historic Preservation Officer, and other interested parties concerning historic properties that could be effected by a specific undertaking. Section 106 is the portion of the National Historic Preservation Act that outlines the procedure. The procedure is codified in 36 CFR 800.

SEED/SAPS. Stand of trees composed of seedlings and or saplings.

SEEDLINGS. A tree grown from seed that has not reached a height of three feet nor a diameter of two inches.

SEVERE STRESS RELIEF AREA. That portion of a crucial winter range to which a wildlife species is confined during the most severe winters. Generally occurs 2 out of 10 years and results in high mortality to any species occupying this area.

SMOKE MANAGEMENT. Application of knowledge of fire behavior and meteorological processes to minimize degradation of air quality during prescribed fires.

SPECIAL FEATURES. Values present in an area under consideration for wilderness, such as ecological, geological, or other features of scientific, educational, scenic, or historical value. They are not required for wilderness designation, but their presence enhances an area's wilderness quality.

SPECIAL RECREATION MANAGEMENT AREA. BLM administrative units established to direct recreation program priorities, including the allocation of funding and personnel, to those public lands where a commitment has been made to provide specific recreation activity and experience opportunities on a sustained yield basis. This includes a long-term commitment to manage the physical, social, and managerial settings to sustain these activity and experience opportunities. Delineation is based on administrative/management criteria including the existence of Congressional designations, similar or interdependent recreation values, homogenous or interrelated recreation uses, land tenure and use patterns, transportation systems, administrative efficiency, intensity of use, high resource values, public concerns, or interagency considerations. These areas usually require a high level of recreation investment and/or management. They include recreation sites, but recreation sites alone do not constitute a special recreation management area.

STABILIZED DUNE. A sand dune protected from wind action by a cover of vegetation.

STIPULATION. A restriction placed on an oil and gas lease or other use authorization to protect other resources (e.g., a seasonal restriction to protect big game in their winter range or in their calving areas). The restriction precludes or restricts activities.

SUPPRESS A FIRE. Extinguish a fire or contain it within specified boundaries.

SURFACE DISTURBANCE. Refers to any action that would cause soil mixing or result in alteration or removal of soil or vegetation and expose the mineral soil to erosive processes. Used in the literal context of actual, physical disturbance and movement or removal of the land surface and vegetation. See "Disturbance Factor for Wildlife."

THREATENED AND ENDANGERED SPECIES. As defined by the Endangered Species Act of 1973 as amended (P.L. 93-205; 87 Stat. 884), an endangered species means "any species which is in danger of extinction throughout all or a significant portion of its range" and a threatened species means "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Whether a species is threatened or endangered is determined by the following factors: (1) present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, sporting, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; or (5) other natural or human-made factors.

THRIVING NATURAL ECOLOGICAL BALANCE. The condition of the public range that exists when resource objectives related to wild horses in approved land use and/or activity plans have been achieved.

THRUST BELT. An intensely faulted belt of mountain ranges. Thrust faults are low angle ruptures in the earth's crust that relieved deep compressional forces. The surface expression of this tectonic activity is westward dipping formations exposed in ridges or mountain ranges. Each ridge moved horizontally and vertically to its position along at least one thrust fault.

TOPOGRAPHIC RELIEF. The positions and elevations of the natural or manmade features of an area that describe the configuration of its surface.

TRONA. A naturally occurring sodium sesquicarbonate that was formed in ancient saline lakes. It is generally honey or light brown in color, depending upon the impurities present. It is the major natural source of soda ash.

UNCONTROLLED FIRE. Any fire which threatens to destroy life, property, or natural resources, and (a) is not burning within the confines of firebreaks, or (b) is burning with such intensity that it could not be readily extinguished with ordinary tools commonly available.

UNDERTAKING. Any project, activity, or program that can result in changes in the character or use of historic properties, if any such historic properties are located in the area of potential effects. The project, activity, or program must be under the direct or indirect jurisdiction of a Federal agency or licensed or assisted by a Federal agency. Undertakings include new and continuing projects, activities, or programs and any of their elements not previously considered under Section 106.

UNIFORM FUELS. Fuels distributed continuously, thereby providing a continuous path for fire to spread.

VALUES AT RISK. Any or all natural resources, improvements, or other values which may be jeopardized if a fire occurs.

VEGETATION MANIPULATION. Land treatment projects designed to improve the growth of more desirable plant species. Biological, chemical, or mechanical methods of vegetation removal, including prescribed burns, are used.

VISUAL RESOURCE MANAGEMENT CLASSES (definition of).

Class I. The objective of this class is to maintain a landscape setting that appears unaltered by humans. It is applied to wilderness areas, some natural areas, wild portions of the wild scenic rivers, and other similar situations where management activities are to be restricted.

Class II. The objective of this class is to design proposed alterations so as to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

VISUAL RESOURCE MANAGEMENT CLASSES (definition of) (Continued).

Class III. The objective of this class is to design proposed alterations so as to partially retain the existing character of the landscape. Contrasts to the basic elements (form, line, color, and texture) caused by a management activity may be evident and begin to attract attention in the characteristic landscape. However, the changes should remain subordinate to the existing characteristic landscape. Structures located in the foreground distance zone (0-1/2 mile) often create a contrast that exceeds the VRM class, even when designed to harmonize and blend with the characteristic landscape. This may be especially true when a distinctive architectural motif or style is designed. Approval by the District Manager is required on a case-by-case basis to determine whether the structure(s) meet the acceptable VRM class standards, and if not, whether they add acceptable visual variety to the landscape.

Class IV. The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. Contrasts may attract attention and be a dominant feature of the landscape in terms of scale; however, the change should repeat the basic elements (form, line, color, and texture) inherent in the characteristic landscape. Structures located in the foreground distance zone (0-1/2 mile) often create a contrast that exceeds the VRM class, even when designed to harmonize and blend with the characteristic landscape. This may be especially true when a distinctive architectural motif or style is designed. Approval by the District Manager is required on a case-by-case basis to determine whether the structure(s) meet the acceptable VRM class standards, and if not, whether they add acceptable visual variety to the landscape.

Rehabilitation Area. Change is needed or change may add acceptable visual variety to an area. This class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding landscape. This class would apply to areas identified in the scenic evaluation where the quality class has been reduced because of unacceptable cultural modification. The contrast is inharmonious with the characteristic landscape. It may also be applied to areas that have the potential for enhancement; i.e., add acceptable visual variety to an area or site. It should be considered an interim or short-term classification until one of the other VRM class objectives can be reached through rehabilitation or enhancement. The desired visual resource management class should be identified.

WETLAND. Lands where at least periodic inundation or saturation with water (either from the surface or subsurface) is the dominant factor determining the nature of soil development and the types of plant and animal communities living there. These include the entire zones associated with streams, lakes, ponds, prings, canals, seeps, wet meadows, and some aspen stands. Wetlands support all fish. They also support more species of wildlife (in higher densities) than any other habitat type in the planning area. They comprise less than one percent of the public land acreage.

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this document, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

WILDFIRE. Any fire occurring on wildland that neither meets management objectives nor occurs within a prescribed fire area, thus requiring a suppression response.

WINDOWS. Short segments of right-of-way corridor utilized when designating a full length right-of-way corridor is not feasible.

WITHDRAWAL. Removal or withholding of public lands, by statute or Secretarial order, from operation of some or all of the public land laws. A mineral withdrawal includes public lands potentially valuable for leasable minerals, precluding the disposal of the lands except with a mineral reservation clause unless the lands are found not to contain a valuable deposit of minerals. A mineral withdrawal is the closing of an area to mineral location and development activities.

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